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Foley et al.

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[54] **GRAPHICAL DISTRIBUTED MAKE TOOL METHODS APPARATUS AND COMPUTER PROGRAM PRODUCTS**

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[73] Assignee: **Sun Microsystems, Inc.**, Palo Alto, Calif.

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[22] Filed: **Dec. 18, 1996**

[51] **Int. Cl.**[6] **G06F 3/00**; G06F 9/44

[52] **U.S. Cl.** **345/334**; 345/349; 345/966; 395/701

[58] **Field of Search** 345/349, 966, 345/970, 334; 395/670, 672, 701, 704; 709/100, 102

[56] **References Cited**

U.S. PATENT DOCUMENTS

5,581,797	12/1996	Baker et al.	345/326
5,604,908	2/1997	Mortson	395/705
5,649,085	7/1997	Lehr	345/440
5,680,530	10/1997	Selfridge et al.	345/440
5,731,997	3/1998	Manson et al.	364/559
5,845,125	12/1998	Nishimura et al.	395/704

OTHER PUBLICATIONS

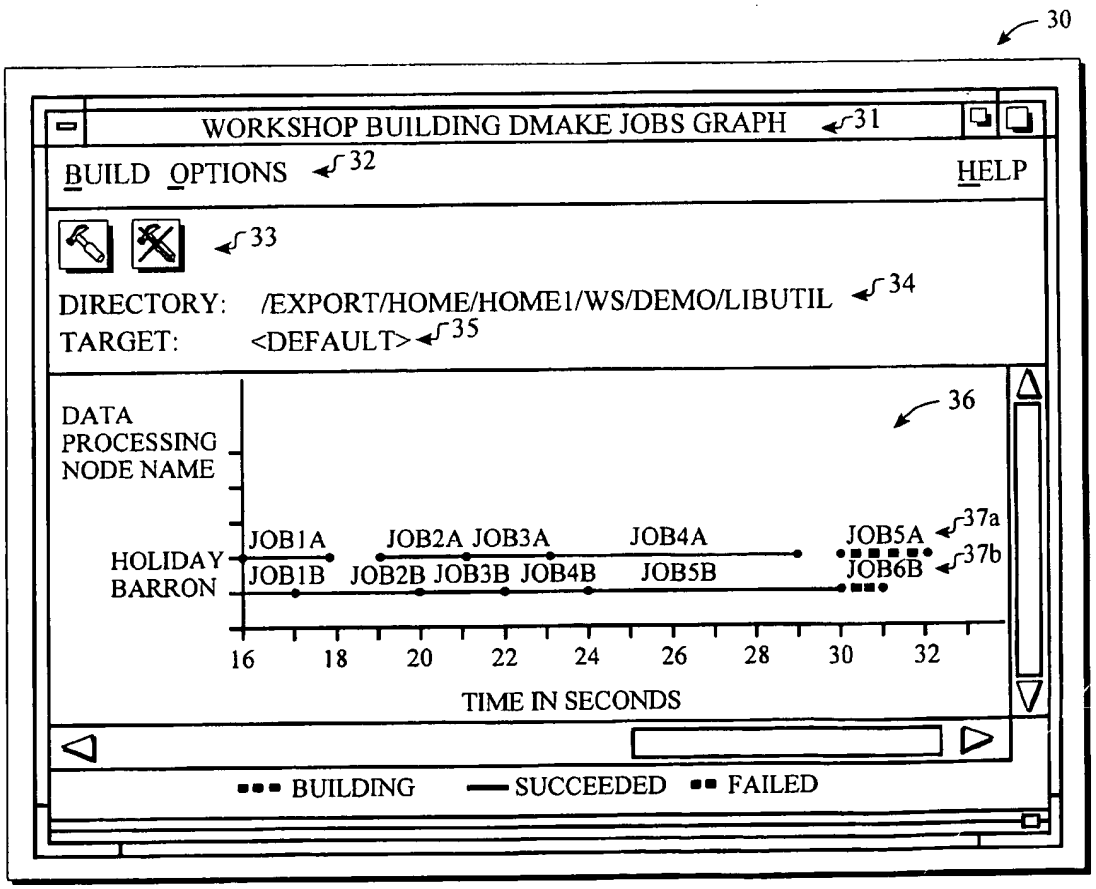
Bruce Boardman, "The Next Corporate IS Frontier", Network computing, n718, PG50, pp. 1, 4, and 5, 1996.

Primary Examiner—Raymond J. Bayerl
Assistant Examiner—X. L. Bautista
Attorney, Agent, or Firm—Sabath & Truong; Robert P. Sabath, Esq

[57] **ABSTRACT**

A make system includes an overlay make tool for graphical presentation of user-friendly data regarding build operations updating multi-file software architecture. The make system includes a make program building files into executable programs, and a make tool which updates files requiring updating according to an update method relying upon a dependency tree and date stamp information.

17 Claims, 5 Drawing Sheets



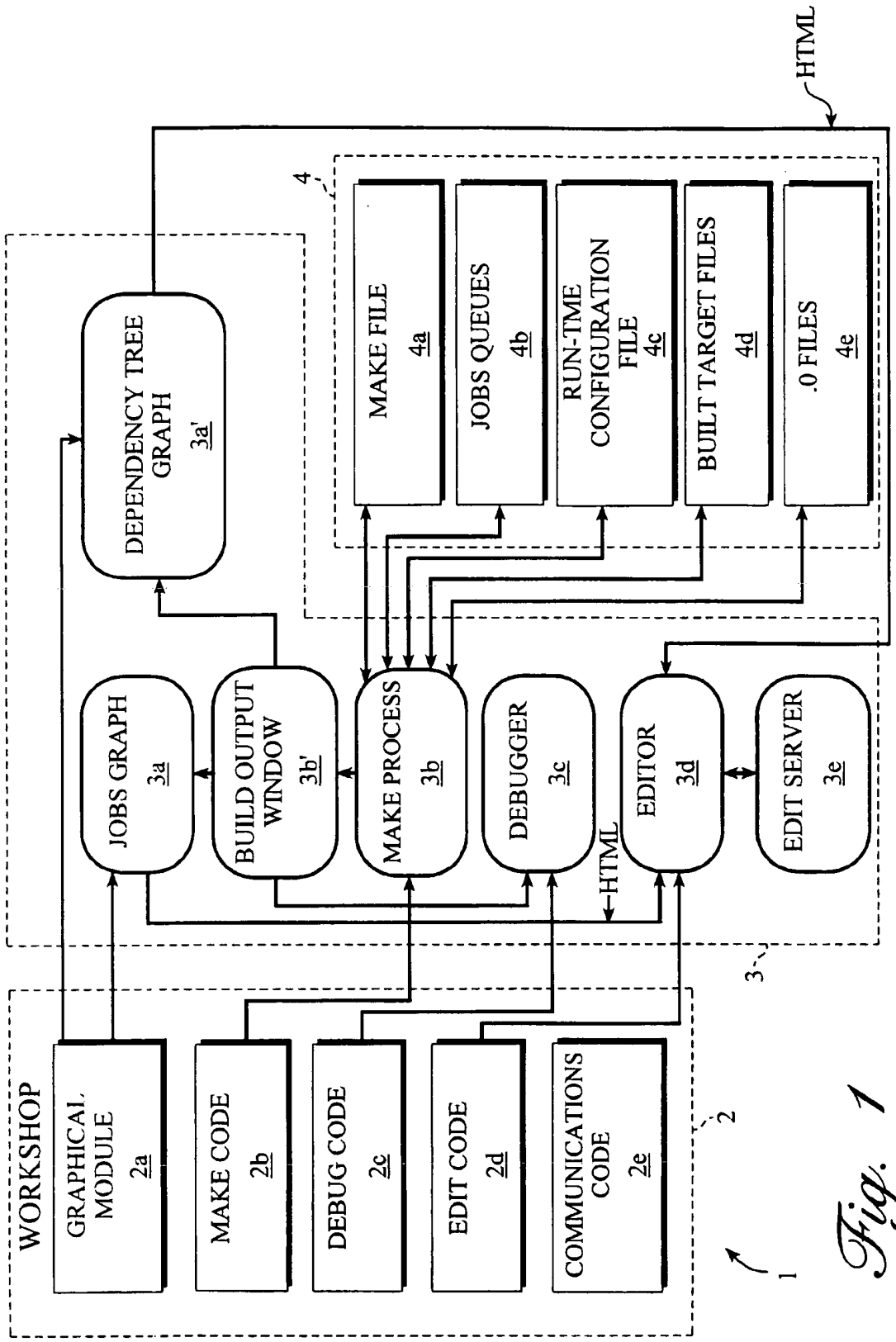

HTML
4
MAKE FILE 4a
JOBS QUEUES 4b
RUN-TIME CONFIGURATION FILE 4c
BUILT TARGET FILES 4d
.0 FILES 4e
DEPENDENCY TREE GRAPH 3a'
JOBS GRAPH 3a
BUILD OUTPUT WINDOW 3b'
MAKE PROCESS 3b
DEBUGGER 3c
HTML
EDITOR 3d
EDIT SERVER 3e
3
WORKSHOP
GRAPHICAL MODULE 2a
MAKE CODE 2b
DEBUG CODE 2c
EDIT CODE 2d
COMMUNICATIONS CODE 2e
2
1

Fig. 1

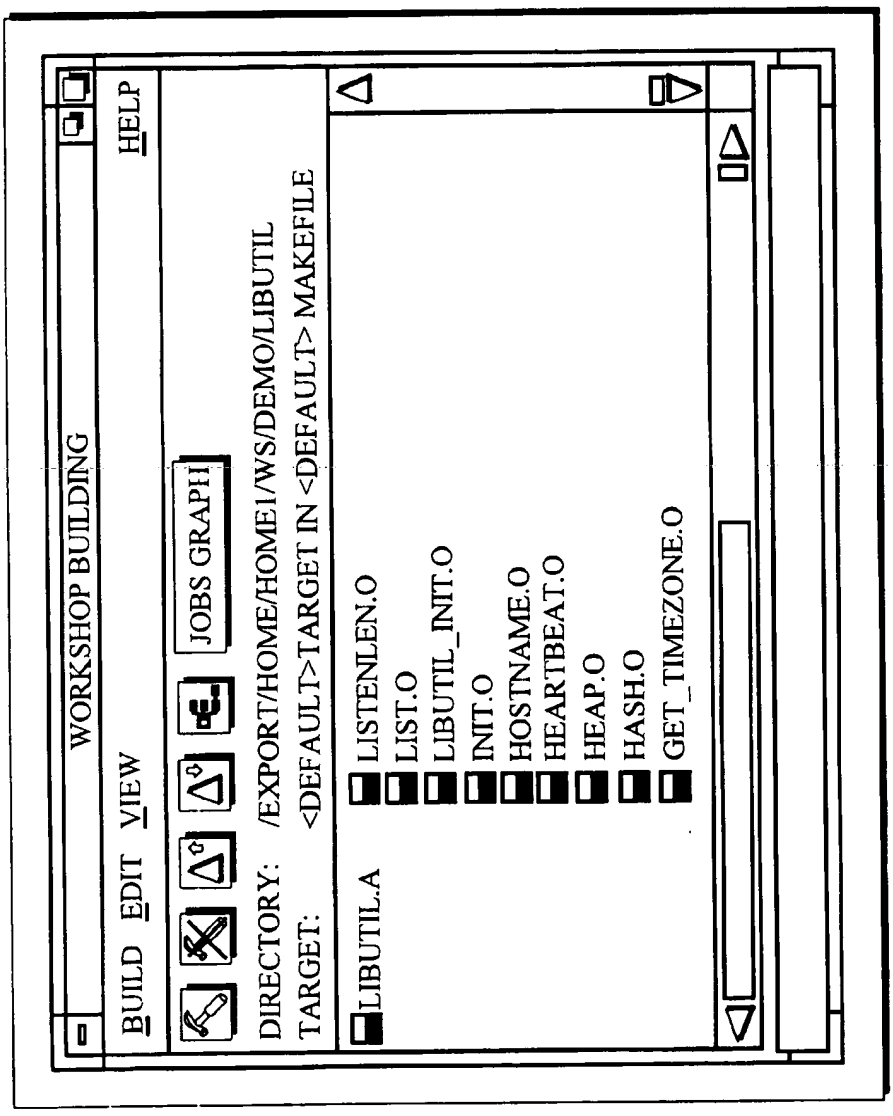


Fig. 2A
(Prior Art)

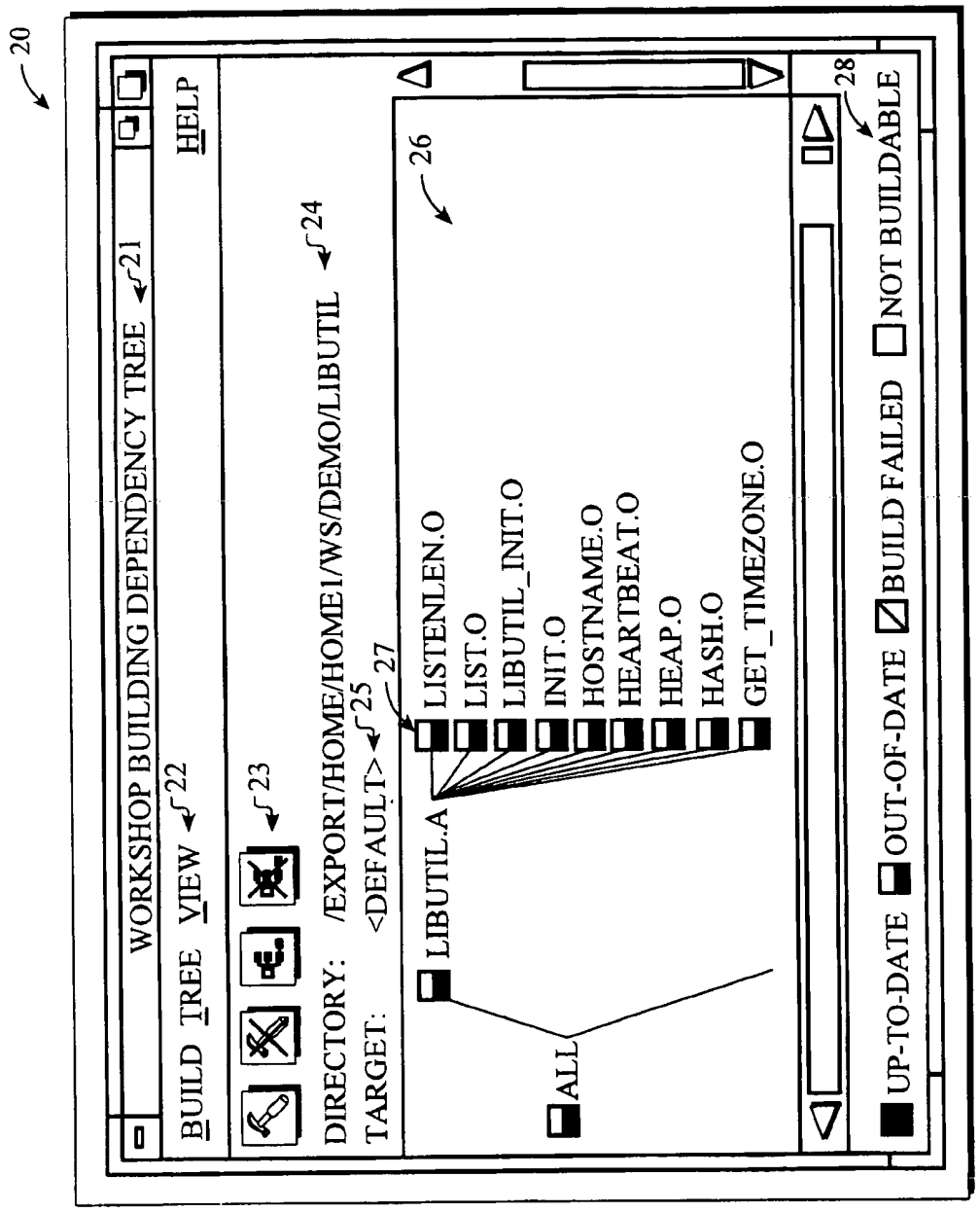

20
WORKSHOP BUILDING DEPENDENCY TREE
21
BUILD TREE VIEW
22
HELP
23
DIRECTORY: /EXPORT/HOME/HOME1/WS/DEMO/LIBUTIL
24
TARGET: <DEFAULT>
25
27
26
LIBUTIL.A
ALL
LISTENLEN.O
LIST.O
LIBUTIL_INIT.O
INIT.O
HOSTNAME.O
HEARTBEAT.O
HEAP.O
HASH.O
GET_TIMEZONE.O
28
UP-TO-DATE
OUT-OF-DATE
BUILD FAILED
NOT BUILDABLE

Fig. 2B

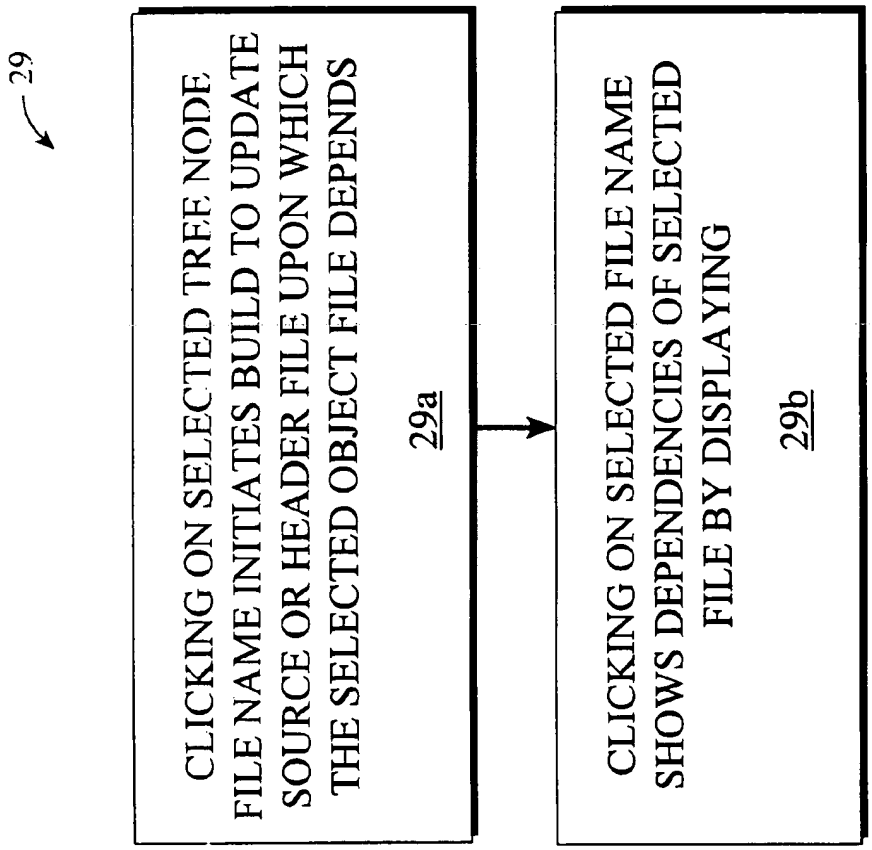

29
CLICKING ON SELECTED TREE NODE FILE NAME INITIATES BUILD TO UPDATE SOURCE OR HEADER FILE UPON WHICH THE SELECTED OBJECT FILE DEPENDS
29a
CLICKING ON SELECTED FILE NAME SHOWS DEPENDENCIES OF SELECTED FILE BY DISPLAYING
29b

Fig. 26

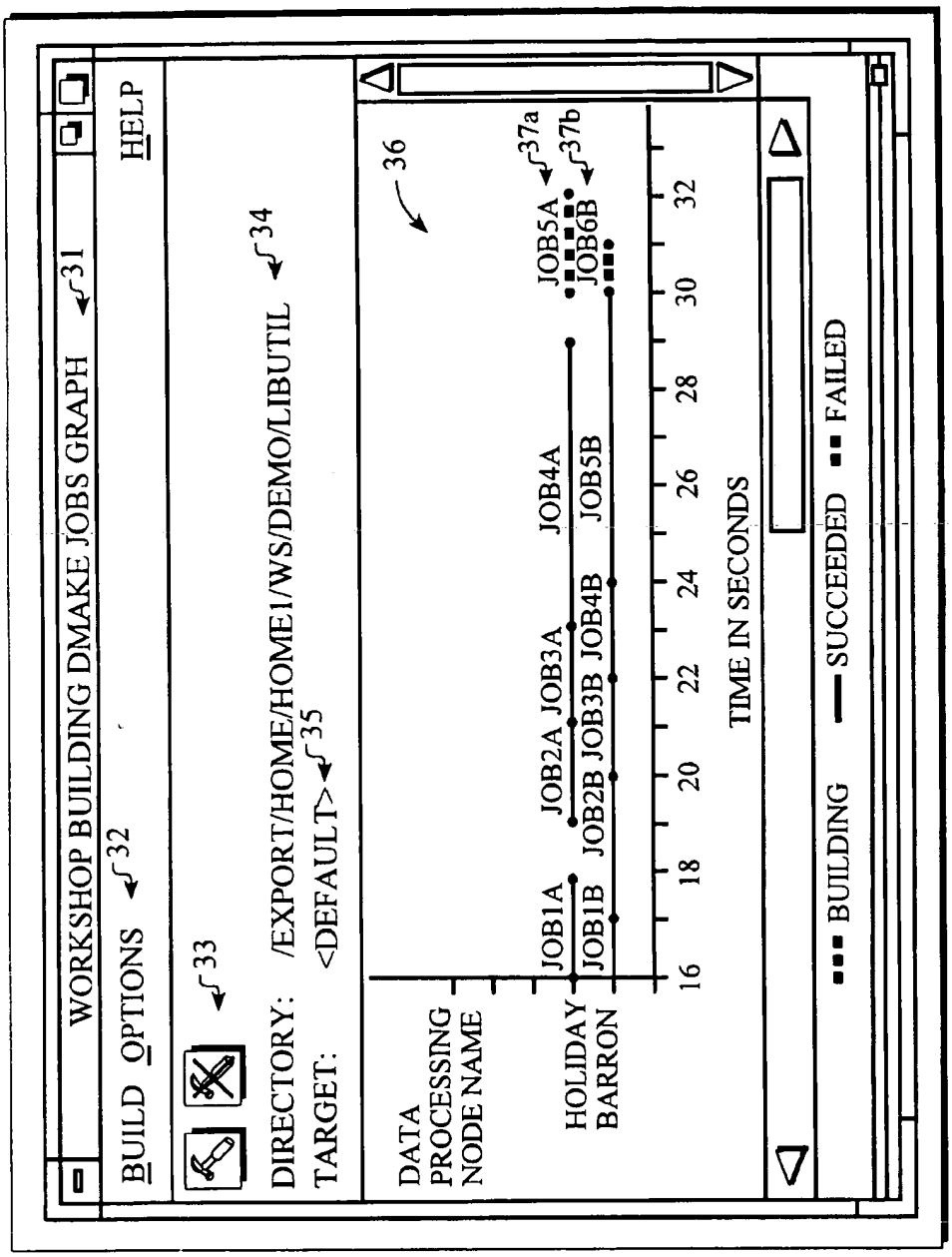

30
WORKSHOP BUILDING DMAKE JOBS GRAPH
31
BUILD OPTIONS
32
HELP
33
DIRECTORY: /EXPORT/HOME/HOME1/WS/DEMO/LIBUTIL
34
TARGET: <DEFAULT>
35
36
DATA PROCESSING NODE NAME
HOLIDAY
BARRON
JOB1A
JOB1B
JOB2A
JOB2B
JOB3A
JOB3B
JOB4A
JOB4B
JOB5A
JOB5B
JOB6B
37a
37b
16
18
20
22
24
26
28
30
32
TIME IN SECONDS
BUILDING
SUCCEEDED
FAILED

Fig. 3

GRAPHICAL DISTRIBUTED MAKE TOOL METHODS APPARATUS AND COMPUTER PROGRAM PRODUCTS

CROSS-REFERENCE TO RELATED APPLICATION

This application is related to first and second patent applications filed on even date herewith on "Distributed Make Methods, Apparatus, and Computer Program Products", U.S. patent application Ser. No. 08/920,934, filed Dec. 18, 1996, by Mitchell Nguyen and Wilmer Walton; and "Job Distribution and Local Balancing Methods, Apparatus, and Computer Program Products," U.S. patent application Ser. No. 08/922,103, filed Dec. 18, 1996, by Mitchell Nguyen. The related applications are hereby expressly incorporated herein by reference in their entirety.

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FIELD OF THE INVENTION

This invention relates to methods, apparatus, and computer program products relating to software utilities for modifying and reconstituting software file elements and modules into operable form.

BACKGROUND OF THE INVENTION

The UNIX environment includes a bundled "make" utility which runs in the UNIX shell, to enable software having multiple source files to be rebuilt into executable or other final form during maintenance. Software maintenance includes updating and modifying software files and then rebuilding files and code dependent upon the changed files. Software being maintained typically includes multiple independent software modules (e.g., .o's). According to the bundled UNIX "make" utility, rebuilding or "build" is accomplished serially by recompiling one source module at a time and then relinking the resultant object files into an executable software product which can be shipped to the customer. According to the prior current source files can be recompiled in parallel at a selected local data processing machine. The cross-referenced applications incorporated herein provide background and details of a current implementation of make. In particular, the make utility identifies source files to be used in rebuilding, compiles the source files serially or in parallel at a single processing node with a suitable compiler, and links the resultant object files into a new rebuilt executable program or other file. A C++ compiler is used to recompile modified .cc object files. A C compiler is used to recompile modified .c object files.

The make utility is useful because it processes many make jobs during build processing which result in creation of an updated resultant software entity which incorporates changes made in precursor code elements used to construct the final entity. The complexity and the workload of the make utility reduces speed of performance. Accordingly, it would be desirable to develop make methods, apparatus and computer program which speed the build process and enables more speedy and effective software maintenance and file modification operations. Furthermore, the software

programmer performing build jobs on multiple files or code elements has little oversight over the status of individual build jobs are completed or interrupted due to error nor on what data processing node a particular job is performed. Additionally, a technical difficulty exists ineffective resolution of errors occurring during make or build jobs. Error diagnosis is thus currently difficult and cumbersome.

SUMMARY OF THE INVENTION

According to the present invention, the progress of make jobs is presented for visual observation on a graphical user display (GUI) by representing the make jobs performed and executed on one or more data processing nodes as time-expandable job presentation elements on a predetermined multidimensional presentation region viewable on the GUI. Each job is represented by a time-expandable job presentation element arranged at an appropriate position within the predetermined presentation region. According to one embodiment of the present invention, the presentation screen is a two dimensional space having x and y coordinates in which the x-coordinate is arranged in a horizontal alignment and the y-coordinate is vertical and perpendicular to the x-coordinate. According to one embodiment, the job presentation elements are elongated along a coordinate axis which represents time, and the magnitude of each elongated job presentation element represents the current time a job has run during execution up to the present moment. When the job has been completed or when it terminates due to an error condition, the length or magnitude of the particular job presentation element is fixed. According to one embodiment, a job presentation element is provided with a selected first color to indicate that the associated job is still executing. Upon completion of the job, the element changes to a selected second color. If the job terminates due to an error condition, the element converts from being represented in the first color into a selected third color. According to the present invention, job presentation elements relating to jobs processed on each data processing node are associated with each other by adjacent sequential positioning. Similarly, job presentation elements relating to jobs processed on different data processing nodes are separated from each other by a predetermined amount of offset within a common predetermined presentation region. According to one embodiment of the present invention, the offset between the position of job presentation elements relating to jobs processed on different data processing nodes is in a horizontal direction. According to one embodiment, job presentation elements relating to next in time order jobs performed on the same data processing node are dovetailed in adjacent positions.

According to the present invention, each job presentation element is a status element for representing the status of an associated job as a job which is currently being processed, as a job which has already been processed and completed, and as a job which has been processed but which has been terminated due to experience of a processing error. Each of these job statuses is associated with a mode or color, according to one embodiment of the present invention. When the status of a job changes from executing to completed or from executing to terminated due to error, then the mode or color changes from one selected state to another. Further according to the present invention, a computer program product graphically presents the performance of make jobs with a mechanism including code devices configured to execute make jobs and to present status information regarding to several make jobs in relationship to each other, both in time and applicable data process node.

According to one embodiment of the present invention, UNIX build operations are displayed graphically in con-

junction with text output on a graphical user interface (GUI). Further according to the present invention, a graphical UNIX make tool displays file dependencies in tree format and includes a line graph capability to display progress in completing make and build operations. According to one embodiment of the present invention, graphical make is accomplished with line graphing as an overlay for the UNIX make utility. According to the present invention, clicking at a tree node shown on a GUI permits selected file building, as well as file state and currency (i.e., in or out of date) determination. Even further according to the present invention, make tool provides line graph information expressing jobs in progress and indicating which machines are building particular files.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram of a file workshop system according to the present invention;

FIG. 2*a* is a screen print of a presentation window display of selected file dependencies according to the prior art;

FIG. 2*b* is a screen print of a tree status graph of files subject to make operation, in accordance with the present invention;

FIG. 2*c* is a flow chart of a tree graph presentation method according to the present invention, including clicking on selected files to show dependencies; and

FIG. 3 is a screen print of line graphs of files subject to make operation, in accordance with the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE PRESENT INVENTION

FIG. 1 is a diagram of a file workshop system **1** according to the present invention. File workshop system **1** includes a plurality of software code modules **2** including **1***a* integrated form a graphical module **2***a*, a make code module **2***b*, a debug code module **2***a*, an edit code module **2***d*, and a communications code module **2***e*. By running software code of software code module **2** according to a method of the present invention, workshop processes **3** are invoked and run as will be discussed in greater detail below. Workshop processes **3** include jobs graph **3***a*, file dependency tree graph process **3***a*', build output window process **3***b*', make process **3***b*, debugger process **3***c*, editor process **3***d*, and edit server daemon process **3***e*. Workshop processes **3** ' create and run with data structure and file entities **4** according to the present invention. Data structure and file entities **4** include without limitation a make file **4***a*, job queues **4***b*, a runtime configuration file **4***a*, built target files **4***d*, and object or o files **4***e*. New software is created, producing new target source file from a plurality of files including but not limited to object files, i.e., ".o's". The new software which has been built, is then debugged with a user directed debugger process **3***c*. Debugger process **3***c* is performed in accordance with instructions provided in debug code module **2***c*, which may comprise well-known conventional debugging software routines. Debugging identifies "bugs" or errors in the newly created software target files which have been built. The target files built are constructed from subordinate object files which have been compiled and linked into executable or other (e.g., text) file form. To edit or maintain the object files upon which the target software depends, editor process **3***c* is invoked. Editor process **3***d* communicates with edit server daemon process **3***e* to make modifications in 0.0 files to correct errors identified in debugging. Make process **3***b* uses a make file **4***a* to identify file dependencies among files which need to be processed to produce a revised built target file **4***d*. Make process **3***b* further processes make jobs taken from job queues **4***b* created in accordance with the dependencies specified in make file **4***a*. According to one embodiment, make process **3***b* distributes the make jobs in job queues **4***b* to a predetermined plurality of data processing nodes for processing to build target files **4***d*. According to another embodiment, parallel make processes can be run on a single data processing node. The results of running make process **3***b* are provided to build output window process **3***b*' from which a jobs graph process **3***a*, dependency tree graph process **3***a*', and debugger process **3***c* can be invoked by the user. Build output window process **3***b*' produces a command line interface and permits entry of information by the user to specify build objects identified by directory, target names, commands to be invoked including selection of command modifiers including but not limited to variables, macros, and selected command line options. According to the present invention, jobs graph process **3***a* and dependency tree graph process **3***a*' are each linked through editor process **3***d* to modifiable files upon which target files depend, such as .o files **4***e*, by a hypertext markup language (HTML) link.

FIG. 2*a* is a screen print of a presentation window display of selected file dependencies according to the prior art. In particular, FIG. 2*a* shows a workshop build window including a tool bar, task icons, a directory indication, a target line, and a text region showing a listing of object files subject to conventional build operation. The title of the build window is "Workshop Building," which refers to a software suite including conventional build functionality. The window presentation, according to this known technology, conveys only a limited amount of information. The window presentation, however, provides no information about currency status, i.e., whether a particular file is up-to-date or out-of-date. Further, no information is provided regarding file status, i.e., whether build failed or whether particular files indicated are not buildable.

FIG. 2*b* is a screen print of a dependency tree graph **20** of the names of files subject to make operation, in accordance with the present invention. In particular, FIG. 2*b* shows dependency tree graph **20** including a header **21**, a menu **22**, task icons **23**, a directory indication **24**, a target line **25**, and a graph region **26** in which a dependency tree of files subject to make operation is presented in terms of their interdependencies. Each file name is shown associated with a rectangular icon **27** according to a legend **28** at the underside of the dependency tree graph window indicative of file currency and status. For example, object files listelem.o-heap.o are shown out-of-date, while object files hash.o-get_timezone.o are shown to be up-to-date. No files are indicated as build failed or as not buildable. All of these files are dependencies of libutil.a, and all is a dependency of libutil.a. Since some of the files from listelem.o-get_timezone.o are out-of-date, it follows that libutil.o and all will have an icon indication of their being out-of-date as well. This status is expressly visually apparent from the tree organization shown in the user-friendly presentation in FIG. 2*b*.

FIG. 2*c* is a flow chart of a dependency tree presentation method **29** according to the present invention. According to the present invention, clicking **29** on a selected tree node file name initiates build operation according to the present invention, to update the source and header files upon which the selected object file depends. Further, clicking **29***b* on a selected object file name causes presentation of the names of the source and header files upon which the selected file depends.

FIG. 3 is a screen print of line graphs of files subject to make operation, in accordance with the present invention. In

particular, FIG. **3** shows a jobs graph **30** including a header **31**, a menu **32**, task icons **33**, a directory indication **34**, a target line **35**, and a two dimensional graph region **36** in which first and second line graphs, respectively **37***a* and **37***b*, illustrate build status in a job-by-job basis, as a function of time in seconds. Each of line graphs **37***a* and **37***b* comprises a series of job presentation elements or segments which have a limited thickness or width, but each of which has a length corresponding to the processing time consumed in executing or running the job associated with the element. Each element can exhibit a mode or color, according to the status of the job as running, failed, or completed. According to one embodiment, a running job is represented by a solid segment or the color green, as it grows or extends as a function of time. As shown in FIG. **3**, make jobs are being performed on first and second data processing nodes, respectively named "holiday" and "barrone." Running on first data processing node "holiday" are jobs named JOB1A–JOB5A. Running on second data processing node "barrone" are jobs named JOB2B–JOB6B. As can be seen, at time **16** JOB1A has begun running and has continued to run for two seconds until it has succeeded in completing the specified task or tasks associated with the job. Then, for one second, data processing node "holiday" ceases processing. Thereafter, at time **19**, JOB2A starts and upon its completion at time **21**, JOB3A starts and continues processing until time **23**, when JOB4A starts and continues processing until time **29**. Again, data processing node "holiday" ceases operation, only to start up again at time **30** with JOB5A which is still building, i.e., in process at the moment the screen shot of FIG. **3** is captured. Parallel jobs named JOB1B–JOB6B have run or have failed as indicated for data processing node "barrone." As shown in FIG. **3**, JOB1B has started prior to time **16**. Earlier job data is not provided in the present setting of the job graph limited to times from 16 seconds to 33 seconds. As further shown, JOB6B has failed. The earlier jobs handled by "barrone" have succeeded serially without "barrone" halting processing at any time.

By clicking on the job processing element for JOB **6**B, according to one embodiment of the present invention, a pull-up screen can be shown which presents a table of error diagnostics which are the reasons for the failure of JOB **6**B. Further according to the present invention, selected words in the error diagnosis table are hyperlinked to modifiable code in files which are subject to edit operation in accordance with the present invention. The appendix contains an embodiment of hypertext markup language (HTML) code to permit the linkage to code containing errors which can be corrected by edit operations according to the present invention. The appendix which follows further includes code to implement graphs in accordance with the present invention. The portion of the appendix entitled "mt_graph.cc" is code for graph generation, and the portion entitled "BuildOutputHTML.cc" is the code for facilitating hyperlink corrections to code needing to be modified to prevent occurrence of error conditions.

What is claimed is:

1. A computer implemented method of graphically presenting the performance of a plurality of make jobs being executed by at least one data processing mode, comprising:

presenting status information regarding processing said plurality of make jobs as a function of dependencies between ones of said plurality of make jobs, said status information including at least one of build failure status and non-buildable status;

presenting first status information regarding processing a first one of said plurality of make jobs as a first function of time, at a selected first position within a predetermined presentation region having at least a single dimension; and

presenting second status information regarding a second one of said plurality of make jobs as a second function of time, at a second position within said predetermined presentation region.

2. A computer implemented method according to claim **1**, further including presenting said first and second status information regarding said first and second ones of the plurality of make jobs adjacently to each other within said presentation region.

3. A computer implemented method according to claim **1**, including offsetting said second position from said first position to present said first and second status information with respect to make jobs performed with different ones of said at least one data processing node, at predetermined intervals along a selected dimension of said common presentation region.

4. A computer implemented method according to claim **3**, including offsetting the first and second positions of said respective first and second ones of the plurality of make jobs from each other in a horizontal direction.

5. A computer implemented method according to claim **3**, including offsetting the first and second positions of said respective first and second ones of the plurality of make jobs in a vertical direction.

6. A computer implemented method according to claim **1**, including dovetailing the presentation of said ones of the plurality of make first and second status information when performed on a single data processing node, so as to display a first indication of performance of said first one of the plurality of make jobs at said first position followed by a second indication of performance of said second one of the plurality of make jobs after said first display location.

7. A computer implemented method according to claim **1**, including presenting first and second status information regarding job performance with a similar status element type representing jobs being processed, jobs successfully having been processed and completed, and jobs processed by subject to processing error.

8. A computer implemented method according to claim **1**, including presenting status information regarding respective jobs being processed, in a selected color to indicate job processing is currently in progress.

9. A computer implemented method according to claim **1**, including presenting status information regarding jobs being processed, in a selected color to indicate job processing has successfully been completed.

10. A computer implemented method according to claim **1**, including presenting status information regarding jobs being processed, in a selected color to indicate job processing is subject to error.

11. A computer implemented method according to claim **1**, including presenting job status information for jobs currently being processed with a time function expanding element.

12. A method according to claim **3**, including changing the color of status information to reflect a change in processing status.

13. A computer program product, comprising:

a computer storage medium and a computer code mechanism embedded in the computer storage medium for graphically presenting the performance of make jobs, the computer program code mechanism comprising:

a first computer code device configured to execute first and second make jobs with at least a single data processing node;

a second computer code device configured to present status information regarding said first and second make jobs at respective first and second positions within a predetermined graphical presentation region; and

a third computer code device configured to present status information regarding processing said make jobs as a function of dependency between ones of the make jobs, said status information including at least build failure status and non-buildable status.

14. A computer apparatus comprising at least a single data processing node configured to execute a plurality of make jobs, at least one of said at least a single data processing node further being configured to present first status information about said plurality of make jobs within a multidimensional graphical presentation region receiving real-time information about the job status of said respective jobs, said first status information being presented as a function of time and the identity of the particular one of said at least a single data processing node which performs particular job processing at least one of said, at least a single data processing node further being configured to present second status information regarding processing said make jobs as a function of dependancy between ones of the make jobs, said status information including build failure status and non-buildable status.

15. A computer implemented method for presenting make job performance information including:

providing a mechanism for executing make jobs;

presenting status information regarding processing said plurality of make jobs as a function of dependencies between ones of said plurality of make jobs, said status information including at least one of build failure status and non-buildable status; and

presenting time and status varying information on each make job executed according to actual make job performance sequence, on a predetermined presentation region.

16. A computer implemented method of responding to a failed make job in a first graphical representation of the progress of make jobs in which each make job is represented by a first hyperlink activable job representation element which has a magnitude corresponding to the time to complete processing or the time to job failure or in a second graphical representation of the progress of make jobs in which each make job is represented by a second hyperlink activable job representation element which has a symbol indicative of a build failure status or a non-buildable status, comprising:

activating a selected hyperlink activable job representation element; and linking to job associated code causing the job failure.

17. The method of claim **16** further comprising displaying said job associated code to allow changes to said code.

* * * * *

US006567108B1

(12) **United States Patent**
Master et al.

(10) **Patent No.: US 6,567,108 B1**
(45) **Date of Patent: May 20, 2003**

(54) **COMPUTER IMPLEMENTED METHOD OF IMPLEMENTING, MAINTAINING, AND UPDATING A BRAND ARCHITECTURE SYSTEM**

(76) Inventors: **Syndi Beth Master**, 1995 University Ave. Ste. 510, Berkeley, CA (US) 94704; **Timothy J. M. Symons**, 4 Greenwood Common, Berkeley, CA (US) 94708

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/438,739**

(22) Filed: **Nov. 11, 1999**

(51) **Int. Cl.**[7] **G06F 3/00**; G06F 17/60

(52) **U.S. Cl.** **345/853**; 345/765; 345/825; 345/826; 345/962; 705/10; 706/47

(58) **Field of Search** 345/331, 339, 345/353, 356, 357, 440, 962, 971, 764, 765, 810, 818, 825, 826, 835, 841, 853, 854; 705/7, 10; 706/46–48, 60, 925

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,701,400 A * 12/1997 Amado ..... 706/47 X
5,995,951 A * 11/1999 Ferguson 706/10
6,029,139 A * 2/2000 Cunningham et al. 705/10
6,078,922 A * 6/2000 Johnson et al. ..... 705/10 X
6,119,101 A * 9/2000 Peckover ..... 705/10 X

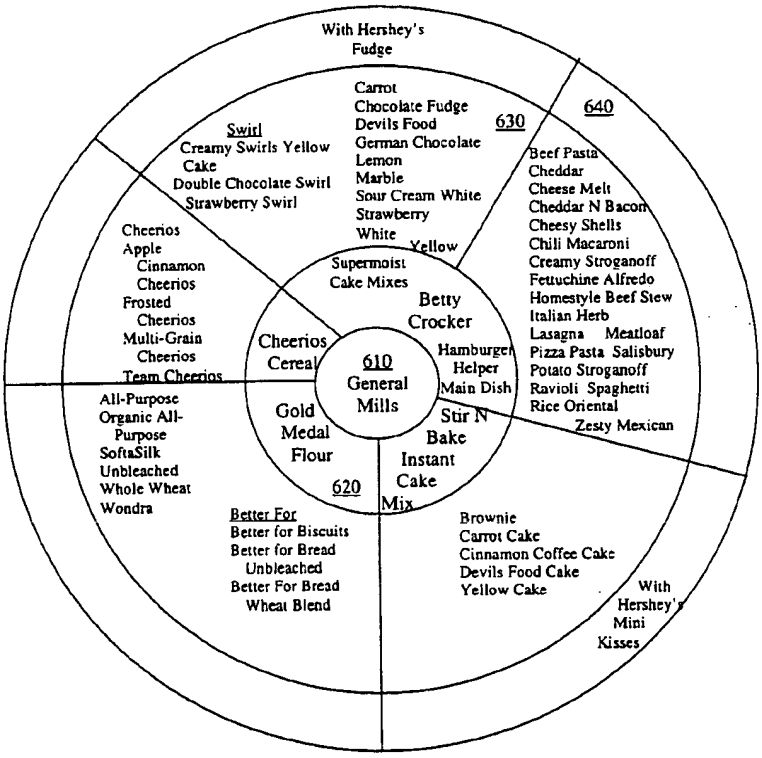
* cited by examiner

Primary Examiner—Raymond J. Bayerl
Assistant Examiner—X. L. Bautista
(74) *Attorney, Agent, or Firm*—Blakely, Sokoloff, Taylor & Zafman, LLP

(57) **ABSTRACT**

A method of implementing an automated brand architecture system is described. The method comprises the computer implemented steps of displaying a navigable brand-architecture chart. The method further comprises receiving a nomination for a new name including a location in the brand-architecture chart. The method further includes testing the name against rules, to see whether the new name fits criteria. If the new name fits criteria, the brand architecture chart is updated with the new name.

35 Claims, 10 Drawing Sheets



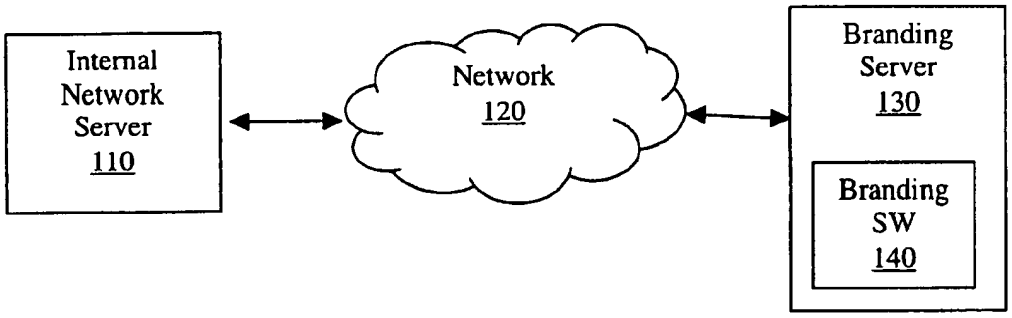

Internal
Network
Server
110
Network
120
Branding
Server
130
Branding
SW
140

Fig. 1

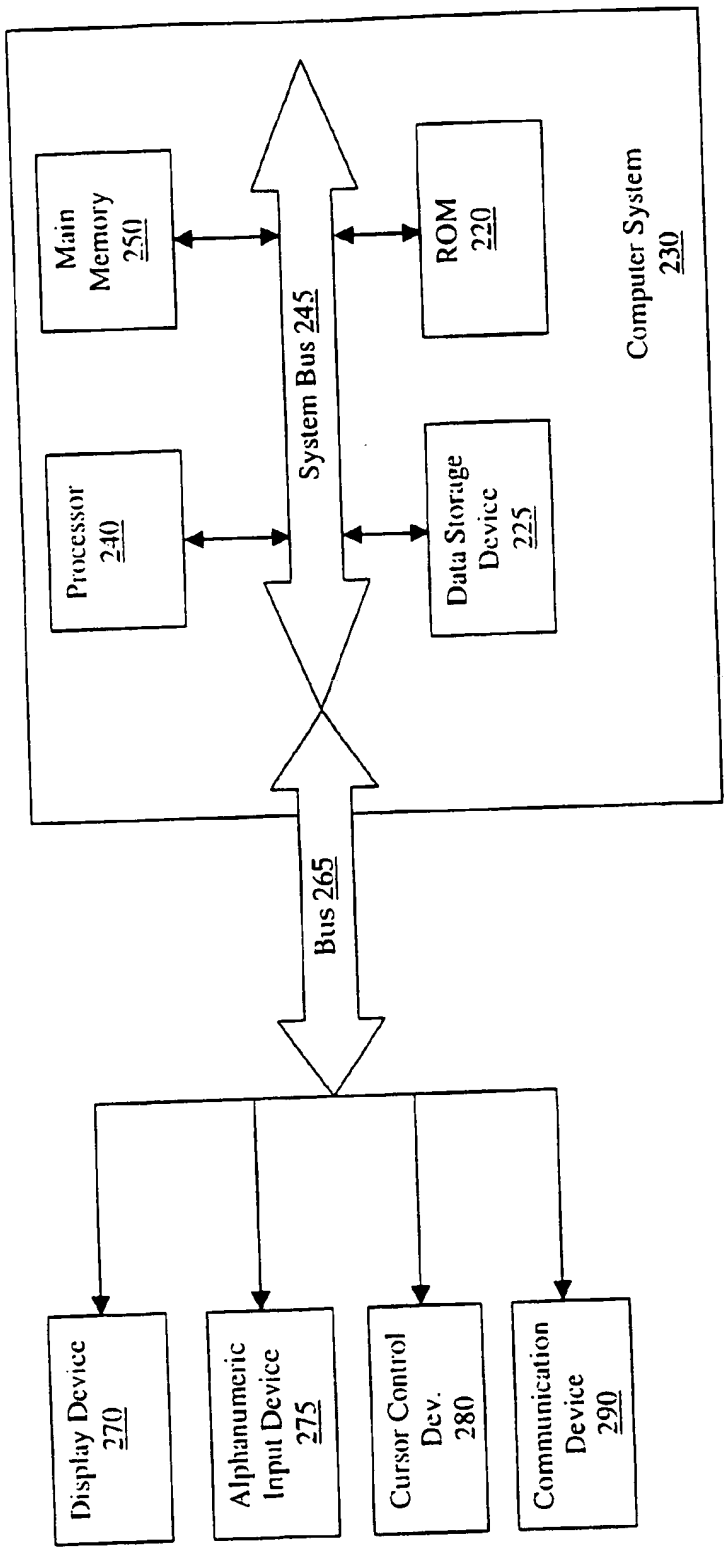

Computer System 230
Main Memory 250
ROM 220
System Bus 245
Processor 240
Data Storage Device 225
Bus 265
Display Device 270
Alphanumeric Input Device 275
Cursor Control Dev. 280
Communication Device 290

Fig. 2

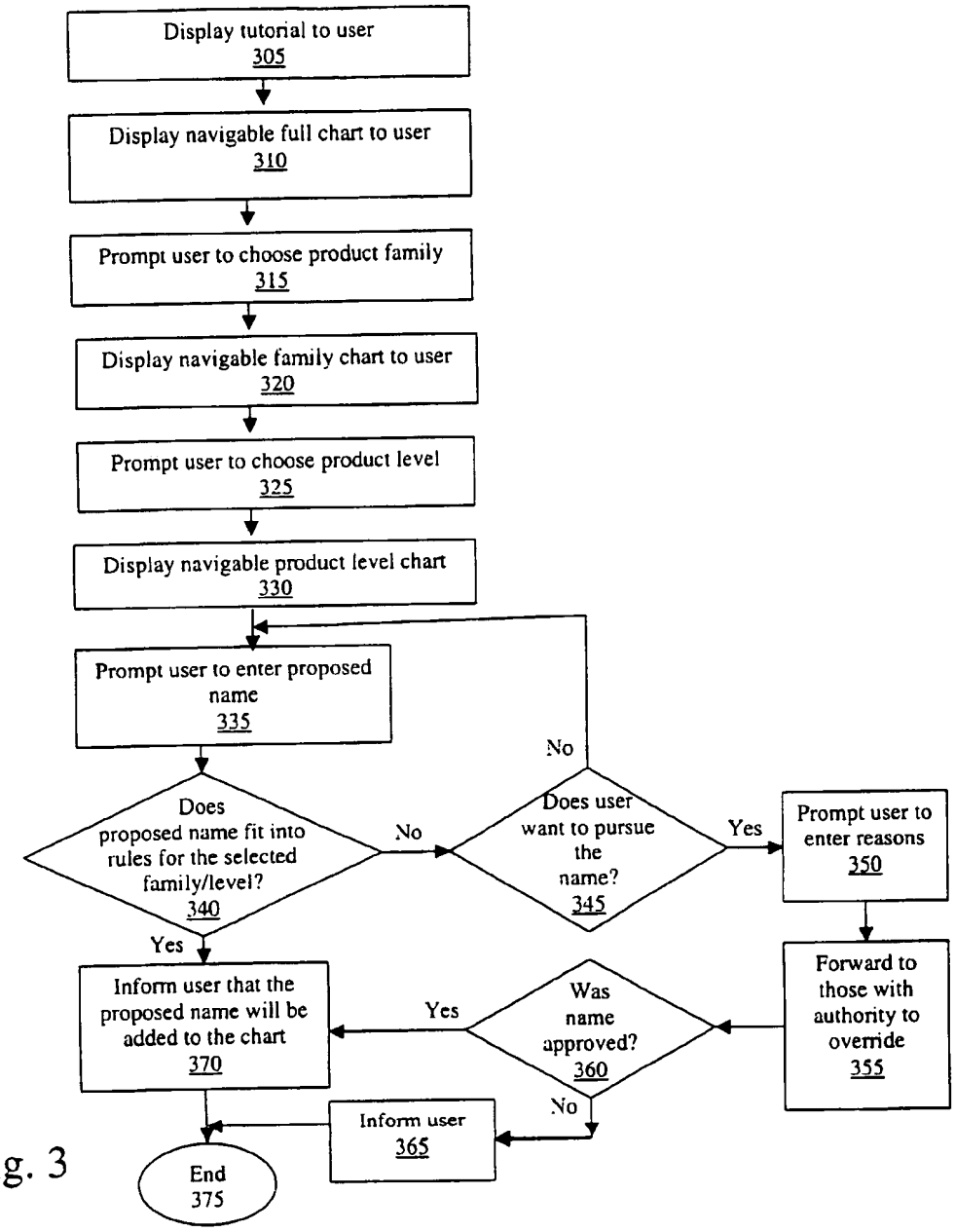

Display tutorial to user
305
Display navigable full chart to user
310
Prompt user to choose product family
315
Display navigable family chart to user
320
Prompt user to choose product level
325
Display navigable product level chart
330
Prompt user to enter proposed name
335
Does proposed name fit into rules for the selected family/level?
340
No
Does user want to pursue the name?
345
No
Yes
Prompt user to enter reasons
350
Forward to those with authority to override
355
Was name approved?
360
Yes
Inform user that the proposed name will be added to the chart
370
Yes
No
Inform user
365
End
375

Fig. 3

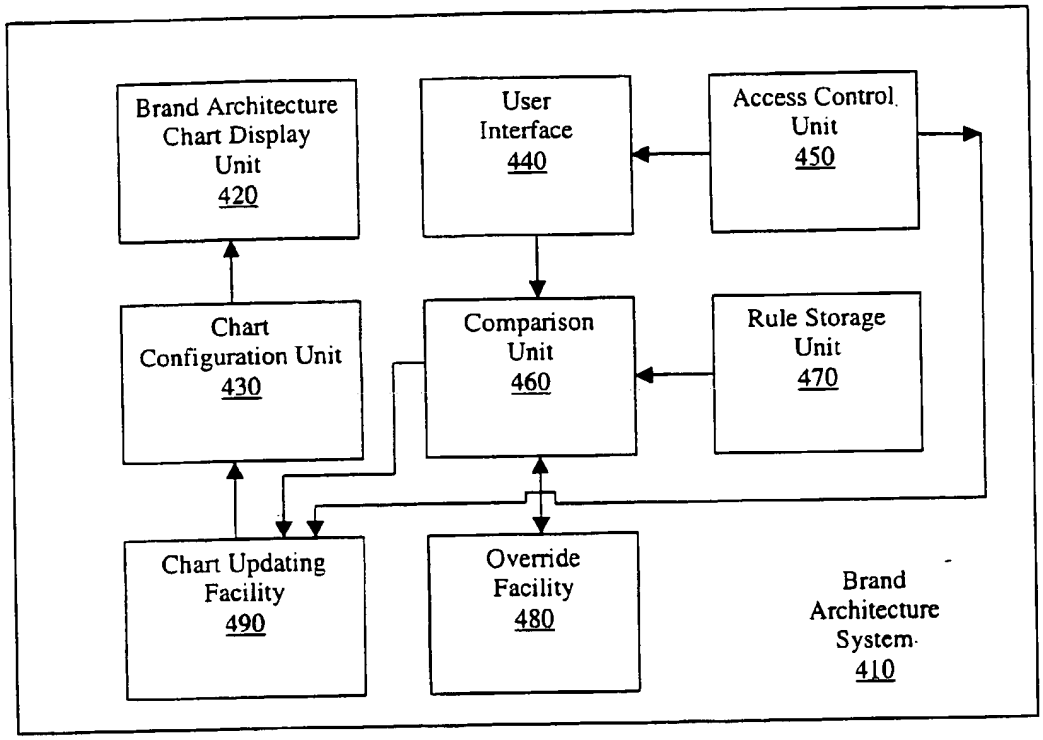

Brand Architecture Chart Display Unit 420
User Interface 440
Access Control Unit 450
Chart Configuration Unit 430
Comparison Unit 460
Rule Storage Unit 470
Chart Updating Facility 490
Override Facility 480
Brand Architecture System 410

Fig. 4

510	Name	
	Title	
	Group	
	Contact Information	
520	First Level	Brand/Product or Ingredient?
530	Second Level	Within what Brand/Product/or Ingredient list?
540	Definition of Product	
550	Proposed Product Name	
560	Proposed Support level for product	
570	Projected income from Product	
580	Does user request help with naming?	

Fig. 5

Corporate Name	GENERAL MILLS				
Product Family Brands	Cheerios Cereal	Betty Crocker		Stir N Bake Instant Cake Mix	Gold Medal Flour Flour
		Super Moist Cake Mix	Hamburger Helper Main Meal Dish		
Products	Cheerios Apple Cinnamon Cheerios Frosted Cheerios Honey Nut Cheerios Multi Grain Cheerios Plus Team Cheerios	Carrot Chocolate Fudge Devils Food German Chocolate Lemon Marble Sour Cream White Strawberry White Yellow Swirl Creamy Swirls Yellow Cake Double Chocolate Swirl Strawberry Swirl	Beef Pasta Cheddar Cheese Melt Cheddar N Bacon Cheesy Shells Chili Macaroni Creamy Stroganoff Fettuccine Alfredo Homestyle Beef Stew Italian Herb Lasagna Meatloaf Pizza Pasta Potato Stroganoff Ravioli Rice Oriental Salisbury Spaghetti Zesty Mexican	Brownie Carrot Cake Cinnamon Coffee Cake Devils Food Yellow Cake	All-Purpose Organic All Purpose Softasilk Unbleached Whole Wheat Wondra Better for Better for Biscuits Better for Bread Unbleached Better for Bread Wheat Blend
Special Ingredients		With Hershey's Fudge		With Hershey's Mini Kisses	

FIGURE 6A

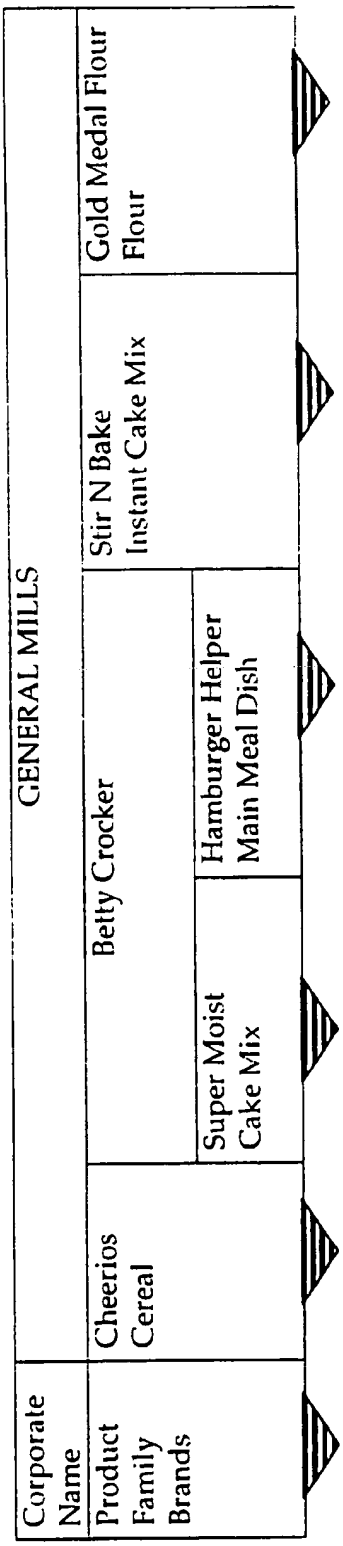

Corporate Name
GENERAL MILLS
Product Family Brands
Cheerios Cereal
Betty Crocker
Super Moist Cake Mix
Hamburger Helper Main Meal Dish
Stir N Bake Instant Cake Mix
Gold Medal Flour Flour

FIGURE 6B

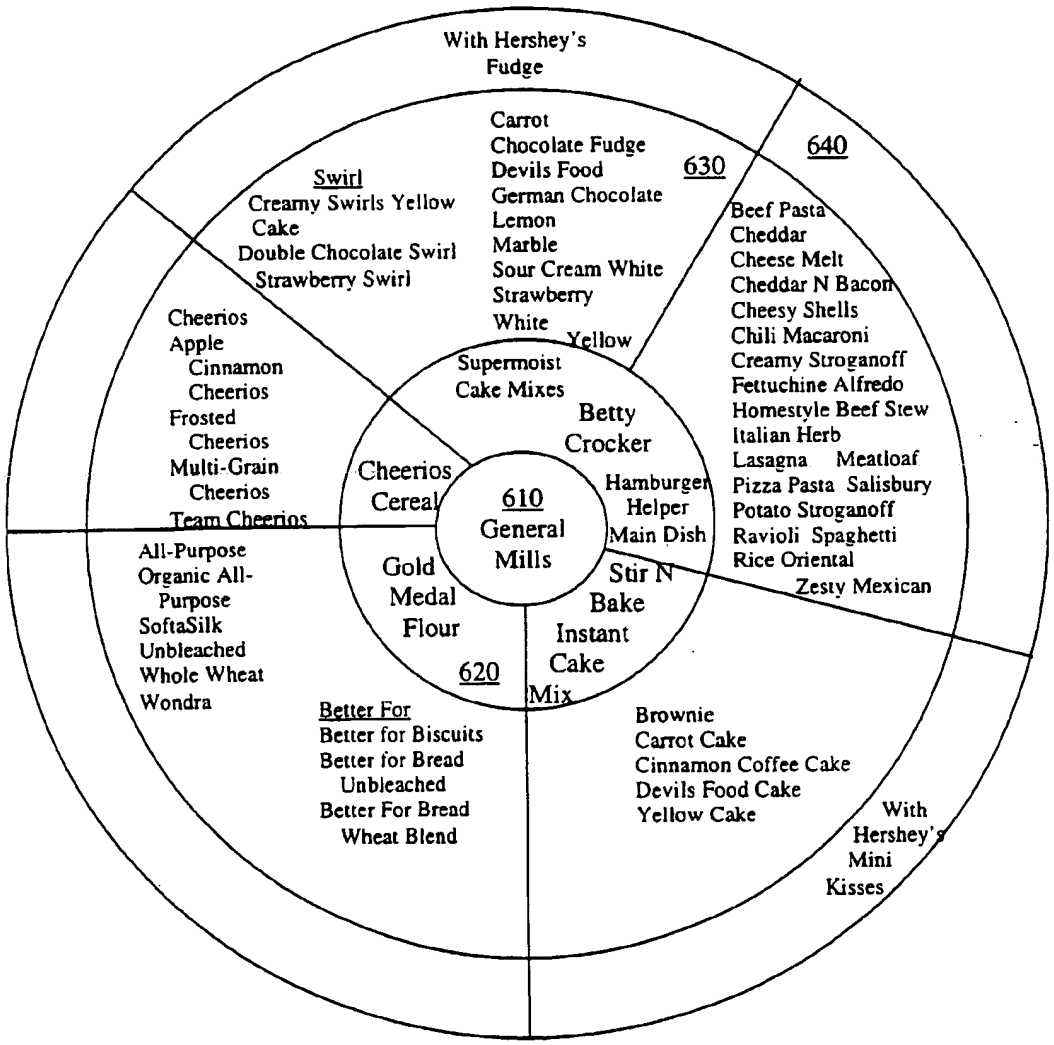

With Hershey's Fudge
Carrot
Chocolate Fudge
Devils Food
German Chocolate
Lemon
Marble
Sour Cream White
Strawberry
White
Yellow
630
640
Swirl
Creamy Swirls Yellow Cake
Double Chocolate Swirl
Strawberry Swirl
Beef Pasta
Cheddar
Cheese Melt
Cheddar N Bacon
Cheesy Shells
Chili Macaroni
Creamy Stroganoff
Fettuchine Alfredo
Homestyle Beef Stew
Italian Herb
Lasagna Meatloaf
Pizza Pasta Salisbury
Potato Stroganoff
Ravioli Spaghetti
Rice Oriental
Zesty Mexican
Cheerios
Apple Cinnamon Cheerios
Frosted Cheerios
Multi-Grain Cheerios
Team Cheerios
Supermoist Cake Mixes
Betty Crocker
Cheerios Cereal
610 General Mills
Hamburger Helper Main Dish
Stir N Bake Instant Cake Mix
Gold Medal Flour
620
All-Purpose
Organic All-Purpose
SoftaSilk
Unbleached
Whole Wheat
Wondra
Better For
Better for Biscuits
Better for Bread Unbleached
Better For Bread Wheat Blend
Brownie
Carrot Cake
Cinnamon Coffee Cake
Devils Food Cake
Yellow Cake
With Hershey's Mini Kisses

Fig. 6C

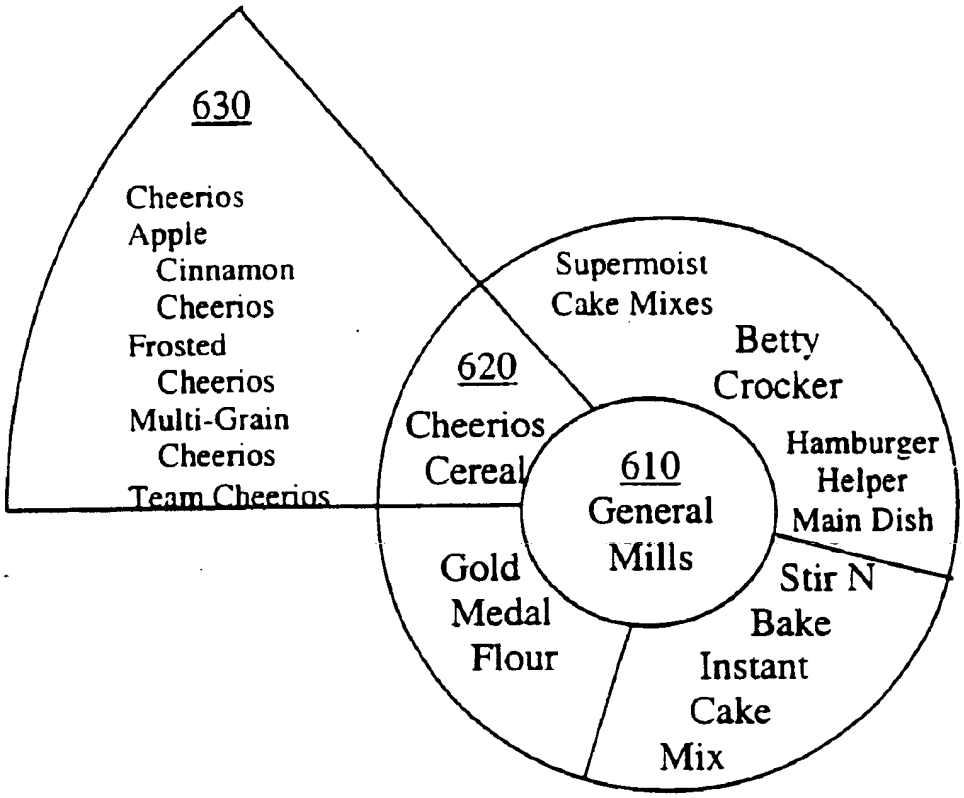

630
Cheerios
Apple
Cinnamon
Cheerios
Frosted
Cheerios
Multi-Grain
Cheerios
Team Cheerios
620
Cheerios
Cereal
Supermoist
Cake Mixes
Betty
Crocker
610
General
Mills
Hamburger
Helper
Main Dish
Stir N
Bake
Instant
Cake
Mix
Gold
Medal
Flour

Fig. 6D

Sample Rules for The Brand Architecture Chart of Figure 6A

Product Family Brands
- Multiple products at launch
- Minimum $50 million launch budget in year 1
- Approval: Executive VP of Marketing and CEO

Products
- Appropriate for flavors, form factors, or other extensions of Product Family brands
- Descriptive terminology only
- Approval: automatic if descriptive terminology employed
- May only consider proprietary (trademarked) sub-brand name (e.g., Softasilk) if:
  - Minimum $20 million launch budget in year 1
  - Potential to line extend sub-brand, such that it could eventually grow into a Product Family brand
  - Approval: Executive VP of Marketing

Special Ingredients
- Must employ the following format: "with [ingredient]"
- Use of ingredient name must be expected to add at least 30% to sales of relevant Product Family brand
- Ingredient must not be greater in prominence than General Mills or Product Family brand, as measured by annual advertising budgets
- Approval: Executive VP of Marketing

Figure 7

COMPUTER IMPLEMENTED METHOD OF IMPLEMENTING, MAINTAINING, AND UPDATING A BRAND ARCHITECTURE SYSTEM

FIELD OF THE INVENTION

The present invention relates to brand architectures, and more specifically, to an automated brand architecture administration system.

BACKGROUND

A brand name is a name or symbol used to identify a seller's goods or services, and to differentiate them from those of competitors. Because a brand name identifies a product's or service's source—protecting against competitors who may attempt to market similar goods or services—companies have an incentive to invest in the quality, consistency, and imagery of their brands.

In the prior art, often there was no unified method to manage brand names within a company. In one prior art system, trademark counsel kept a list of trademarks and trademark filings for the purposes of keeping trademarks up-to-date and renewing them. Product managers in the organization created new products and potential names for them. The product managers then requested a search for trademark availability of the names. Other companies did not do any searching, causing the companies to risk being sued for trademark infringement.

Generally, in the prior art, organizations had no marketing or strategic central determiner for whether a product needed a name or whether the name chosen by the product manager was appropriate. Furthermore, each time an additional product or service was created the trademark counsel and product manager had to individually process the proposed name.

Therefore, it would be advantageous to reduce the complexity of administering a company's brand names.

SUMMARY OF THE INVENTION

A method of automatically managing and maintaining a brand architecture is described. The method comprises displaying a navigable brand-architecture chart. The method further comprises helping users identify the appropriate, approved location of the desired name on the brand architecture chart. The method further includes testing the name against rules, to see whether the name fits the criteria. If the new name fits criteria, for one embodiment the proposed name is automatically sent to an approver, or to a legal department for approval. For another embodiment, the brand architecture chart is automatically updated with the new name.

For one embodiment, if the name does not fit the criteria, an appeal process to higher tier managers may be automatically triggered. For one embodiment a request for additional conforming name candidates is generated and sent to the appropriate party or parties.

DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

FIG. 1 is a block diagram of one embodiment of a network on which the present invention may be used.

FIG. 2 is one embodiment of computer system on which the present invention may be implemented.

FIG. 3 is a flowchart of one embodiment of the method of editing the brand architecture chart.

FIG. 4 is a block diagram of one embodiment of the branding software.

FIG. 5 is a sample filled-out questionnaire.

FIG. 6A is an example of a possible layout for a brand architecture chart.

FIG. 6B is an example of a possible layout for displaying a portion of the brand architecture chart of FIG. 6A.

FIG. 6C is another example of a possible layout for a brand architecture chart.

FIG. 6D is an example of a possible layout for displaying a portion of the brand architecture chart of FIG. 6C.

FIG. 7 is an example of the rules implemented by the sample brand architecture charts of FIGS. 6A–D.

DETAILED DESCRIPTION

In the present invention, a brand architecture system is described. A brand architecture specifies and organizes the naming relationships among a company's brands, products, services, divisions, subsidiaries, etc. A well-conceived brand architecture will accommodate company and product line growth, and provide guidance for future product and service names. Some brand architectures are comprised of many tiers, with specific naming guidelines for each.

The brand architecture system described includes a navigable brand-architecture chart. A user is permitted to nominate a new name including a desired location on the brand-architecture chart to the system. For one embodiment, the user may be anyone with authority to access the brand architecture chart. For one embodiment, employees at different tiers have different tiers of access, from viewing access only, to name proposal access, to alteration access.

The proposed new name is tested against the naming rules at that location, to see whether the name fits criteria. If the new name fits the criteria, for one embodiment upon the approval of the legal department and/or a designated approving authority, the brand architecture chart is automatically updated with the new name. Alternatively, the brand architecture chart may be updated without the specific approval, based on the fit of the proposed name into the chart. For an alternative embodiment, the new name is added to a list of approved names, and the brand architecture chart is updated by an individual with alteration access.

For one embodiment, if the name does not fit the criteria, alternative allowable naming parameters are suggested. For one embodiment, if the name not fit the criteria, an appeal process to higher tier managers is automatically triggered. For one embodiment, request for additional name candidates is also sent to the appropriate parties.

FIG. 1 is a block diagram of one embodiment of a network on which the present invention may be used. An internal network server **110** may be set up on a client's system. The internal network server **110** is accessed by a plurality of clients.

The internal network server **110** accesses a system **130** on which the brand architecture software is implemented through a network **120**. For one embodiment, this system **130** may be referred to as the brand architecture system **130**, although the server may not be a dedicated server, and the brand architecture software may be on an existing LAN/Intranet. For one embodiment, the internal network server

110 may be the same computer as the brand architecture server 130. For another embodiment, the internal network server 110 may be a separate computer, and the network 120 may be an internal large area network (LAN), wide area network (WAN), the Internet or other network. For yet another embodiment, the brand architecture server 130 may be outside the company, and in fact may be administered by someone outside the company. In that case, the network 120 may be the Internet. For one embodiment, if the network 120 is the Internet, communications between the internal network server 110 and the brand architecture server 130 may be secured by using secure hypertext transmission protocol (https), by encryption, or through some other means of securing the communication. The brand architecture server 130 includes brand architecture software 140, which is described in more detail below.

FIG. 2 is one embodiment of computer system on which the present invention may be implemented. FIG. 2 illustrates a typical data processing system upon which one embodiment of the present invention is implemented. It will be apparent to those of ordinary skill in the art, however that other alternative systems of various system architectures may also be used.

The data processing system illustrated in FIG. 2 includes a bus or other internal communication means 245 for communicating information, and a processor 240 coupled to the bus 245 for processing information. The system further comprises a random access memory (RAM) or other volatile storage device 250 (referred to as memory), coupled to bus 245 for storing information and instructions to be executed by processor 240. Main memory 250 also may be used for storing temporary variables or other intermediate information during execution of instructions by processor 240. The system also comprises a read only memory (ROM) and/or static storage device 220 coupled to bus 240 for storing static information and instructions for processor 240, and a data storage device 225 such as a magnetic disk or optical disk and its corresponding disk drive. Data storage device 225 is coupled to bus 245 for storing information and instructions.

The system may further be coupled to a display device 270, such as a cathode ray tube (CRT) or a liquid crystal display (LCD) coupled to bus 245 through bus 265 for displaying information to a computer user. An alphanumeric input device 275, including alphanumeric and other keys, may also be coupled to bus 245 through bus 265 for communicating information and command selections to processor 240. An additional user input device is cursor control device 280, such as a mouse, a trackball, stylus, or cursor direction keys coupled to bus 245 through bus 265 for communicating direction information and command selections to processor 240, and for controlling cursor movement on display device 270.

Another device that may optionally be coupled to computer system 230 is a communication device 290 for accessing other nodes of a distributed system via a network. The communication device 290 may include any of a number of commercially available networking peripheral devices such as those used for coupling to an Ethernet, token ring, Internet, or wide area network. Note that any or all of the components of this system illustrated in FIG. 2 and associated hardware may be used in various embodiments of the present invention.

It will be appreciated by those of ordinary skill in the art that any configuration of the system may be used for various purposes according to the particular implementation. The control logic or software implementing the present invention can be stored in main memory 250, mass storage device 225, or other storage medium locally or remotely accessible to processor 240. Other storage media may include floppy disks, memory cards, flash memory, or CD-ROM drives.

It will be apparent to those of ordinary skill in the art that the methods and processes described herein can be implemented as software stored in main memory 250 or read only memory 220 and executed by processor 240. This control logic or software may also be resident on an article of manufacture comprising a computer readable medium having computer readable program code embodied therein and being readable by the mass storage device 225 and for causing the processor 240 to operate in accordance with the methods and teachings herein.

The software of the present invention may also be embodied in a handheld or portable device containing a subset of the computer hardware components described above. For example, the handheld device may be configured to contain only the bus 245, the processor 240, and memory 250 and/or 225. The handheld device may also be configured to include a set of buttons or input signaling components with which a user may select from a set of available options. The handheld device may also be configured to include an output apparatus such as a liquid crystal display (LCD) or display element matrix for displaying information to a user of the handheld device. Conventional methods may be used to implement such a handheld device. The implementation of the present invention for such a device would be apparent to one of ordinary skill in the art given the disclosure of the present invention as provided herein.

FIG. 3 is a flowchart of one embodiment of the method of accessing and querying the brand architecture chart. At block 300, the process starts. The process starts when an authorized user accesses the software, and indicates that he or she wishes to access the brand architecture, to learn about it, to test a name candidate against it, or to add a new item to the architecture.

At block 305, a tutorial is displayed. For one embodiment, the tutorial may be optionally skipped. For one embodiment, this step may be omitted entirely. The tutorial may teach a branding philosophy and/or strategy of the company, the objectives of the branding architecture. The tutorial may include the company's brand architecture policies, methodologies, and rules. For one embodiment, the tutorial may further teach how the branding structure of the company works. For one embodiment, the tutorial may be interactive. Alternatively, the tutorial may be text based, video based, audio based, or in an other format.

At block 310, a navigable brand architecture chart is displayed to the user. Sample charts are shown in FIGS. 6A–D. For one embodiment, this chart may be large enough to cover multiple pages or screens.

For one embodiment, the chart is displayed hierarchically, i.e. only the product family names are displayed, and the user can select to display the lower tier information for each family. For another embodiment, another method of displaying the chart may be used. FIGS. 6B and 6D illustrate another embodiment of the chart, permitting access to all tiers of the chart, while displaying only the relevant portions of the chart.

For one embodiment, the user may access the brand architecture chart without initiating the editing process. In that instance, the process stops here, and the user can view the navigable brand architecture chart. If the user initiates the editing process, the process continues to block 315.

At block 315, the user is prompted to choose a specific tier of the chart they wish to view. For one embodiment, this is

a selection from a pull-down menu or by clicking the tier in the chart. For another embodiment, the user types in the tier name. For yet another embodiment, the user is not directly prompted for this information, but is rather asked to fill in a questionnaire from which this information is deduced. A sample of the questionnaire is included in FIG. **5**. For another embodiment, another means of selecting the tier may be used. For one embodiment, this tier may be a "product family" as shown in FIGS. **6**A–D. Alternative organizations of brand architecture charts may have alternative tiers, and selections.

At block **320**, the navigable chart of the selected tier is displayed to the user. This is a subset of the brand architecture chart displayed at block **310**. For embodiment, this is the same chart, with the colors altered, to indicate the selected tier.

At block **325**, the user is prompted to choose a product tier. As above, this choice may be made in a variety of ways, including automatically based on the questionnaire.

At block **330**, the tier and product tier chosen is displayed to the user.

At block **335**, the user is prompted to enter a proposed name.

At block **340**, it is determined whether the proposed name fits into the rules of the selected family and tier. As will be discussed in more detail below, the rules restrict the types of names that will be acceptable at each tier. The purpose of the rules is to ensure the implementation of the company's adopted brand architecture, and simplify naming options. These rules are discussed in more detail below, with respect to FIG. **7**. If the proposed name fits into the rules, the process continues to block **370**. At block **370**, the user is informed that the proposed name will be added to the chart.

For one embodiment, the chart is automatically updated at this stage. If, for example, only those with naming authority within the company have access to this process, automating the updating of the chart may be advantageous. The process then ends at block **375**. For another embodiment, the approved name is added to a list of proposed names. An authorized person with authority to update the chart then can update the actual chart. For another embodiment, the proposed name may be sent to the legal department or other appropriate person for approval. For example, the company may wish to review a name, even if it fits the rules, to verify that the name is appropriate, that there are no trademark issues, and/or that there are no other criteria that are not embodied in the brand architecture chart.

If the proposed name did not fit into the rules, at block **340**, the process continues to block **345**. At block **345**, it is determined whether the user wishes to proceed with the name in spite of this. For one embodiment, this is determined by prompting the user. For one embodiment, the user should meet certain criteria in order to proceed at this stage. For example, the user may be asked to commit a certain amount of money from his or her budget to search and/or provide marketing support for the proposed name. Other indications of the user's commitment to the name may also be requested. If the user does not wish to go ahead with the name, the process returns to block **335**, and the user is again prompted to enter a proposed name. If the user wishes to go ahead with the name, the process continues to block **350**.

At block **350**, the user is prompted to enter reasons why the non-conforming name should be approved. For one embodiment, this may be done in the form of a questionnaire, or a free-form data entry. For one embodiment, the user provides projections for the product that is being named, including potential sales, etc. For one embodiment, the user's answers to the questions will determine whether the name is likely to be approved although it is outside the approved architecture.

At block **355**, the user's entry is forwarded to a designated individual or group who have authority to override the rules embodied in the brand architecture. For one embodiment, this step automatically generates an e-mail sent to the authorized person or persons, including the user's name suggestion, why it does not conform to the branding architecture, whether override criteria have been met, and any other relevant information. Designated persons are authorized to approve the override. For one embodiment, this step automatically connects to a organization chart of the company, and determines correct person or persons to receive this e-mail. For one embodiment, the correct person may be a branding executive, a marketing executive and/or the intellectual property legal department.

For one embodiment, the user is disconnected from this process at this stage. For one embodiment, the user is informed that the request is being forwarded to the person or persons authorized to approve the override request. For one embodiment, the time for approval may be days or weeks.

At block **360**, it is determined whether the name has been approved. For one embodiment, the authorized person may return an affirmative or negative statement directly to the brand architecture software. The brand architecture software then analyzes the response, and determines whether it was positive or negative. For one embodiment, if multiple people have authorization to override, either a subgroup of or all of the group must return an affirmative answer in order to end with an approval.

For another embodiment, if the system does not receive a response, either affirmative or negative, within a preset period, the system sends a reminder request to the authorized persons.

If an affirmative response is received, the process continues to block **370**, and the user is informed that the requested name has been approved and the proposed name will be added to the chart, and the chart is updated.

If a negative response is received, the process continues to block **365**, and the user is informed of the unfavorable response. For one embodiment, the user is also provided a pointer to follow, to reapply for a new name. For one embodiment, the user may follow this pointer, and not have to select the product family and product tier, but rather go directly to block **335**, to propose a new name. For one embodiment, the user can request help developing alternative names. A request is then sent to the appropriate name development person or outside agency.

The process terminates at block **375**.

FIG. **4** is a block diagram of one embodiment of the brand architecture software. The brand architecture system **410** includes a brand architecture chart display unit **420**. The brand architecture chart display unit **420**, for one embodiment, is capable of displaying a multi-page brand architecture chart, in various formats. For one embodiment, the format may be a hypertext markup language (HTML) format, a JavaScript implemented format, or another display format. For one embodiment, the chart display unit **420** permits navigation along a family, tier, or arbitrary axis.

The chart configuration unit **430** controls which parts of the chart are displayed by the display unit **420**. For one embodiment, as a user navigates through the chart, a narrower and narrower slice of the chart may be visible. The chart configuration unit **430** controls this, based on data from

the user interface. If, for example, as described above, the user selects a particular product family, the chart configuration unit **430** instructs the chart display unit **420** to display only the selected product family.

The brand architecture system **410** further includes a user interface **440**. The user interface **440** allows a variety of users to access the chart. An access control unit **450** is coupled to the user interface. The access control unit **450** determines the access tier of each user. For one embodiment, the access control unit **450** includes a plurality of classifications for potential users of the system **410**. For example, there may be trusted users, those with authority to actually update the system, authorized users, those with authority to propose new names for inclusion in the chart, and other users, those who may look at the system, but may not change it. For another embodiment, the access control unit **450** may use some other method, such as a list of names, to determine access tiers.

For one embodiment, the user interface **440** is configured to the appropriate tier for a user, once that user accesses the system **410**. For one embodiment, the user interface **440** displays only those options that are available to the user.

A comparison unit **460** is coupled to the user interface **440**. When the user interface **440** receives a proposed name, for a selected product family and product tier, this information is passed to the comparison unit **460**. The comparison unit **460** accesses the rules for this particular product family and product tier in the rule storage unit **460**. If the name passes the rules, the user is informed of this. For one embodiment, the rules are displayed to the user by the comparison unit **440**. If the proposed name meets rules, the name is submitted for approval and entry into the brand architecture chart. If the proposed name is a non-conforming name, the proposed name is forwarded to the override facility **480**, if the user so requests.

For one embodiment, the comparison unit **460** automatically determines whether the name as proposed passes certain rules. Certain of the rules may be automatically tested by comparison unit **460**. For example, if the rule states that all product names must start with the letter "N," the comparison unit **460** may test whether the proposed name passes this rule. Similarly, for rules such as incorporating certain words, or family brand names, into the proposed name, having a certain number of letters in a name, etc. the comparison unit **460** may automatically determine whether the rule is met by the proposed name.

For one embodiment, for certain rules, the user is merely made aware of the rule and the user has to determine whether the rule is met by the proposed name. For example, for a rule such as "the name must be descriptive" the comparison unit **460** may not test the proposed name, for one embodiment. Rather, the user determines whether the proposed name meets the rule, or whether the override facility should be invoked.

For one embodiment, if the comparison unit **460** determines that the name does not meet the rules, the user is informed of this. For another embodiment, if the comparison unit **460** determines that the name does not meet rules, this is highlighted for the approving authority.

If the name does not pass the rules, the user may ask for assistance for generating alternate names. The a request may automatically be sent to a naming company, or other agency internal to or external to the company, to assist the user in generating an appropriate name. For one embodiment, the comparison unit **460** permits the user to generate this message, and passes the message to the appropriate organizations and/or individuals.

If the name did not pass the rules, but the user confirms that he or she wishes to go ahead with the name, the comparison unit **460** passes the information to the override facility **480**.

The override facility **480** automatically forwards the override request to an authorized approver. For one embodiment, the override request is e-mailed to the authorized approver. If the authorized approver is not within the secure network on which the brand architecture system **410** resides, the e-mail or other notification may be encrypted or otherwise secured.

The override facility **480** receives the response(s) from the authorized approver(s). For one embodiment, the override facility **480** sends a reminder or other notification if no response is received within a set period. When the response, or all of the responses, are received, the override facility determines whether the response(s) are positive or negative. For one embodiment, if there are multiple responses, the system can be set to require positive responses from all approvers, or from only a certain number of approvers, or from only a certain approver. The override facility **480** returns the affirmative or negative indication to the comparison unit **460**.

The comparison unit **460** forwards this information to the user, and to the chart updating facility **490**. If the name was approved, the chart updating facility **490** updates the chart displayed by the display unit **420**. For one embodiment, the chart updating facility **490** can automatically update the chart if the nominated name either meets the rules, meets the rules and has been approved, or if the override request is approved. For another embodiment, the chart updating facility **490** maintains approval information. Then, the next time a user with authority to alter the chart logs in, this information is made accessible to the user, and the user can add the approved names.

FIG. **5** is a sample questionnaire. The sample questionnaire is drawn up to correspond to the structure illustrated in FIGS. **6A–D**. Of course, as the brand architecture changes for each company, the questionnaire would change correspondingly. It is to be understood that FIG. **5** is exemplary, and should not be interpreted to be a complete or necessary format for such a questionnaire.

A similar type of questionnaire may be displayed to a user attempting to nominate a new name for a new product, service, feature, or technology. The flowchart described in FIG. **3** may be automatically processed—the selection of the appropriate category for the name, the name selection, as well as the method of going outside the rules—based on the information filled into the questionnaire.

The general information **510** that is requested from the user may include the user's name, title, group, and contact information. For one embodiment, the general information **510** may be automatically filled in based on the user's log-in into the system. However, the user is permitted, in one embodiment, to alter the data in the general information category **510**.

The first tier selection **520** permits the user to select a brand, product, or category for the new name, in the example chart of FIGS. **6A–D**. The user can select whether the new item will be a product family brand, a product, or an ingredient or feature.

The second tier selection **530** permits the user to select a subcategory for the new name. For example, in the brand architecture of FIGS. **6A–D**, if the user selected a Product as the first tier selection for the proposed name, the user at this point can select whether the proposed name should be added

into the Cheerios Cereal product family, the Super Moist Cake Mix family, etc. After this selection is complete, the system knows what the category and subcategory location is for the new name. Of course, this type of categorization may continue. For example, included in the Cheerios Cereal product family, there may be further sub-categories, such as Children's Cheerios and Adult Cheerios or Low Salt Cheerios and Standard Cheerios. Any such sub-categorizations could be consecutively selected by the user. The user may select either to the lowest tier, i.e. the lowest subcategory available, or the user may suggest the name for a higher tier. For example, in the brand architecture of FIGS. **6**A–D, the user may propose a new product family, such as Baking Ingredients.

The product/service definition category selection **540** permits the user to enter a description. This may be optional, unless the user wishes to select a name outside the rules for the selected location.

The proposed name **550** is the new name the user wishes to add to the brand architecture. For one embodiment, the user may review the rules for the proposed location for the name. For one embodiment, the user may be able to view the list of current names within the selected location, in order to simplify the name selection. For another embodiment, the user may see examples of approved names.

For one embodiment, a secondary questionnaire page may be shown to the user if the user's first proposed name has been found to be non-conforming name. For one embodiment, these questions are always shown to the user, but the user is only specifically prompted to fill in the answers if the name is a non-conforming name.

The user's commitment to the product **560** may include a certain amount of money from a budget to research and/or provide marketing support for the name. Other indications of commitment, such as manpower, advertising budget may also be requested. For one embodiment, the commitment tier **560** is automatically requested for product family brands. For one embodiment, this question is only displayed for lower categories if the name was found to be a non-conforming name and the user wishes to submit the name for extra-ordinary authorization.

The projected income from the product **570** is similar to the commitment tier. For one embodiment, the projected income is automatically requested for certain tiers, such as product family brands and special ingredients, but is not requested for lower tiers, unless the proposed name is a non-conforming name.

The request for help naming the product **580** may also be displayed. For one embodiment, the request for help is displayed only when the user's initial name is rejected. For another embodiment, the request for help may also be displayed if the proposed name is a non-conforming name and is likely to be rejected, or if a user is attempting to overcome a rejection. For one embodiment, the request for help **580** sends an e-mail or other communication to an outside agency or to a naming group within the corporation, to assist the user is selecting an appropriate name. For one embodiment, this is a discontinuous process, such that the user is disconnected from the brand architecture system, and is separately contacted with naming help.

FIG. **5** illustrates one example a questionnaire that may be used to guide a user through the naming process. For an alternative embodiment, the user may make all of the above selections through navigating web pages or computer display screens and the brand architecture chart, and using menus. These types of selections among choices and entry of data may be used, and are well known in the art.

FIG. **6**A is an example of a brand architecture chart that may be displayed by the present invention. The brand architecture chart of FIG. **6**A is only a sample chart, implementing sample rules. It is to be understood that the methods used to generate this chart may be used to generate more or less complex charts, and implement dissimilar rules. The format of the chart may also vary from the format shown in FIG. **6**A. FIG. **6**A is merely one possible display of one sample chart. FIG. **6**C illustrates an alternative display for the brand architecture chart. It is to be understood FIGS. **6**A–D illustrate exemplary displays of the brand architecture chart.

This brand architecture chart is an example of a chart that may be viewed, queried, manipulated, and updated by the invention, as described above. The General Mills product line is shown as an example. No affiliation of this patent is meant or implied by using the General Mills product line as an example. All trademarks mentioned in the chart and in the text below are the property of their respective owners.

The first tier **610** is the corporate name **610**, which is General Mills.

The second tier **620**, are product family names. In this example, product family names **620** include a number of different brands, for example Cheerios cereals, Betty Crocker's Supermoist Cake Mix, Hamburger Helper, Stir N Bake, and Cold Medal Flour. In this example, the product family names **620** may be fanciful names, such as Cheerios, or descriptive names, such as Super Moist Cake Mix. In other examples, a wide variety of other types of names may be allowed.

For a different company, the second tier **620** may not be product family names, but rather, for example, service types, or targeted customers, or another type of category. The selection of the actual categories for the brand architecture chart is not made by the present system, but rather implemented by a person or persons who are familiar with the brand architecture of the actual corporation.

The third tier **630**, in this case, is specific products. Thus, in each product family brand **620** there are a number of specific products **630**. Thus, for example, the Stir N Bake product family brand **620** includes Brownies, Carrot Cake, and other products. In this example, the products **630** generally have descriptive names. For some product family brands **620**, e.g. Cheerios, the product names **630** each include the product family brand name.

Again, in a different corporation, this tier may have a different name, and different rules, and different types of names or name relationships may be allowed.

The fourth tier **640**, in this case, is special ingredients or features. Certain products **630** may further include special ingredients **640**. For one embodiment, the special ingredients **640** may be items are named on the package, or otherwise highlighted. As can be seen, the special ingredients **640** in this instance are descriptive names of the actual additional ingredient.

As discussed above, these tiers and the items within each tier are entirely dependent on the actual structure of the corporation. For example, in a service corporation, the categories would be different, as would the types of items within each category. Similarly, the rules implemented at each tier may differ substantially depending on the actual corporation. The above list of products and product organizations has been derived independently based on products currently available for a company. It is not to be taken as an actual representation of the products or brand architecture of the company in question. Furthermore, this does not imply any connection between the patentee and the company.

FIG. 6B illustrates a portion of the brand architecture chart of FIG. 6A. FIG. 6B shows a sample display format for displaying a large brand architecture chart that would generally not fit on a single page. The user can select one of the arrows **650**, for example, selecting the Super Moist Cake Mix product family brand **620**. In that instance, the products listed within this product family brand **620** would be displayed. For one embodiment, the higher categories are not shown, and only the current category, i.e. product family brand, product, or special ingredients is displayed. For another embodiment, once a product family brand **620** is selected, the lower and higher tiers associated with the selected product family brand **620** are displayed. Thus, for example, if the user selects the Cheerios Cereal product family brand **620**, the display would include the Corporate name, the Cheerios Cereal product family brand **620**, and the products **630** (not shown) that belong in the Cheerios Cereal Product Family brand **620**. In this way, the user can easily navigate the brand architecture chart, while only seeing the relevant category at any time.

FIG. 6C illustrates another alternative method of displaying a brand architecture chart. The brand architecture chart is shown as a circular structure, with the corporate name at the center, product family brands in the first ring, products in the second ring, and special ingredients in the third ring. It is to be understood that other brand architecture charts, not having similar components, could similarly be shown in a circular structure.

FIG. 6D illustrates a portion of the brand architecture chart of FIG. 6C. FIG. 6D shows a sample display format for displaying a large brand architecture chart that would generally not fit on a single page. The user can select one of the arrows **650**, for example selecting the Cheerios Cereal product family brand **620**. In that instance, the products **630** listed within this product family brand **620** would be displayed. For one embodiment, the higher categories are not shown, and only the current category, i.e. product family brand, product, or special ingredients is displayed. For another embodiment, once a product family brand **620** is selected, the lower and higher tiers associated with the selected product family brand **620** are displayed. Thus, for example, if the user selects the Cheerios Cereal product family brand **620**, the display would include the Corporate name, the Cheerios Cereal product family brand **620**, and the products **630** that belong in the Cheerios Cereal Product Family brand **620**. In this way, the user can easily navigate the brand architecture chart, while only seeing the relevant category at any time.

It is to be understood that FIGS. 6A and 6C are exemplary displays of brand architecture charts. Alternative display formats, such as three dimensional triangular, diamond shaped, or having some other shape suited to the particular brand architecture may be used.

FIG. 7 shows a sample set of rules that are implemented in the brand architecture chart of FIGS. 6A–D. The rules may include naming conventions, such as the form of the proposed name, the syllables in the name, the length of the name, the distinctiveness of the name, and any other rules the corporation may wish to implement. The rules may further include information and/or requirements regarding the use of logos, colors, typefaces, and graphics.

The rules may include such rules as the number of products in a product family at launch, the budget, etc. For one embodiment, certain categories, such as product family and proprietary product names may automatically require the approval of someone. In these instances, the flowchart automatically follows the "name rejected" route, described above.

It is to be understood that these rules are only exemplary rules, and different rules may be implemented. Additional rules may be implemented as well, including such rules as requiring a trademark search for a new name, requiring certain persons to support a new name, etc. Other rules may be specific to the corporation—for example, a rule may be that new product names must start with the letter T. Any rules that can be imagined may be implemented in the rules for the brand architecture chart. In this manner, the approval of new names and the adding of new names to the brand architecture chart to form a coherent branding strategy may be automated.

In the foregoing specification, the invention has been described with reference to specific exemplary embodiments thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the invention as set forth in the appended claims. Each brand architecture solution will vary more or less from these examples. Similarly, the display formats and the rules that are implemented vary based on the actual structure of the corporation and the brand strategy of the corporation. The focus of the present invention is the automatic requests, updating, and referrals, as described above. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. A computer-implemented brand architecture system comprising:

a hierarchical brand-architecture chart comprising:

at least one group displayed at a first tier;

a plurality of items displayed at a second tier, each of the plurality of items at the second tier categorized under at least one group of the first tier; and

an updating facility for updating the navigable brand-architecture chart, such that a new entry is entered in a proper group of the plurality of groups, and at a proper tier.

2. The system of claim **1**, wherein the plurality of tiers comprise:

a first tier including a plurality of product families;

a second tier including a plurality of individual products, wherein each of the individual products are categorized in one of the product families.

3. The system of claim **2**, wherein the second tier includes a product group having multiple individual products within the product group.

4. The system of claim **1**, further comprising:

a chart configuration unit for controlling the amount of the chart that is displayed.

5. The system of claim **1**, further comprising:

a comparison unit, for receiving a proposed name, and for comparing the proposed name against a set of rules, and determining is the proposed name fits within the rules.

6. The system of claim **5**, further comprising:

an override facility, the override facility for requesting permission to override the rules, and permit the proposed name that failed the rules.

7. The system of claim **6**, wherein requesting permission comprises automatically sending a request to authorized personnel, and determining whether the response was affirmative or negative.

8. The system of claim **1**, further comprising:

an access control unit for limiting access to the brand architecture chart, the access control unit permitting only certain users to alter the chart.

9. The system of claim 8, wherein the access control unit permits certain users to alter the chart, and certain other users to request a new name.

10. A method of implementing an automated brand architecture management system, comprising:

displaying a hierarchical brand-architecture;

receiving a nomination for a new name including information indicative of a position in the hierarchy of the brand-architecture;

comparing the nomination against rules to determine whether the new name fits criteria; and

if the new name fits criteria submitting the nomination for approval and, automatically updating the brand-architecture with the new name upon receipt of approval.

11. The method of claim 10, wherein if the new name does not fit the criteria,

determining if there is an exception procedure; and

if there is an exception procedure, implementing the exception procedure.

12. The method of claim 11, wherein the exception procedure comprises:

automatically electronically sending the nomination and accompanying information to an authority who can approve the exception to the rules.

13. The method of claim 12, further comprising:

receiving a response from the authority; and

if the response is affirmative, automatically updating the brand architecture chart, and informing a nominator of the affirmative response.

14. The method of claim 13, further comprising:

if the response is negative, informing a nominator of the negative response, and permitting the nominator to nominate a new proposed name for the product.

15. The method of claim 13, further comprising:

if the response is negative, informing a nominator of the negative response and permitting the nominator to request help generating a proposed name that would result in a positive response.

16. The method of claim 13, wherein the authority is a plurality of persons, and wherein the response comprises a plurality of responses, and an affirmative response comprises affirmative responses from each of the plurality of persons.

17. The method of claim 11, wherein the exception procedure comprises:

requiring a commitment from the nominating group to support the new name.

18. The method of claim 10, wherein the rules comprise a limitation on a type of name being used.

19. The method of claim 10, wherein the step of receiving a nomination for a new name including a location in the brand-architecture chart, comprises:

receiving a filled-in questionnaire, indicating a tier and a category, and a proposed name.

20. The method of claim 19, wherein after the user selects a product family and a product tier, the rules for naming within that product family and product tier are displayed to the user, prior to allowing the user to enter the nomination.

21. The method of claim 20, further comprising indicating to the user that the name may be outside of the rules, if certain conditions are met.

22. The method of claim 10, wherein the step of receiving a nomination for a new name comprises:

prompting a user to select a product family, after reviewing the entire brand chart;

prompting the user to select a location, after reviewing the entire product family; and

prompting the user to enter the nomination for a proposed product name.

23. A method of maintaining a brand architecture management system to simplify maintaining coherent branding strategy, the method comprising:

defining a brand architecture chart including current and proposed names;

defining a rule set for the brand architecture chart to maintain the coherent branding strategy;

incorporating the rule set into an automatic nomination system that receives new name nominations from users; and

prompting a user to compare a new name nomination against the rule set, and accepting the new name nomination if the new name fits within the rule set.

24. The method of claim 23, wherein if the new name nomination does not fit within the rule set, the method further comprises:

permitting the user to request help in selecting a different name; and

permitting the user to appeal the decision to an authority that may override the rule set.

25. The method of claim 23, further comprising automatically adding the new name to the brand architecture chart if the new name is accepted.

26. An automated brand architecture management system comprising:

a rule storage unit for storing pre-determined rules;

a display mechanism for displaying a hierarchical brand-architecture;

a user interface for receiving a nomination for a new name from a user, the nomination including information indicative of a position in the hierarchy of the brand-architecture;

a comparison unit for comparing the nomination against the pre-determined rules from the rule storage unit, to determine whether the new name fits criteria and submitting the nomination for approval if the new name meets the pre-determined rules; and

a chart updating facility for automatically updating the brand-architecture with the new name upon receipt of approval.

27. The automated brand architecture management system of claim 26, further comprising, if the new name does not fit the criteria:

an override facility for implementing an exception procedure.

28. The automated brand architecture management system of claim 27, wherein the exception procedure comprises the override facility automatically electronically sends the nomination and accompanying information to an authority who can approve the exception to the rules, if the new name.

29. The automated brand architecture management system of claim 28, further comprising:

the override facility for receiving a response from the authority; and

if the response is affirmative,

a chart updating facility for automatically updating the brand architecture chart, and informing a nominator of the affirmative response.

30. The automated brand architecture management system of claim 29, further comprising:

if the response is negative,

the user interface for informing a nominator of the negative response, and permitting the nominator to nominate a new proposed name for the product.

31. The automated brand architecture management system of claim **29**, further comprising:

if the response is negative,

the user interface for informing a nominator of the negative response; and

an access control unit for permitting the nominator to request help generating a proposed name that would result in a positive response.

32. The automated brand architecture management system of claim **28**, wherein the authority is a plurality of persons, and wherein the response comprises a plurality of responses, and an affirmative response comprises affirmative responses from each of the plurality of persons.

33. The automated brand architecture management system of claim **26**, wherein the exception procedure comprises:

the override facility requiring a commitment from the nominating group to support the new name.

34. The automated brand architecture management system of claim **26**, wherein the rules comprise a limitation on a type of name being used.

35. The automated brand architecture management system of claim **34**, wherein after the user selects a tier, the user interface displays rules for naming within that tier, prior to allowing the user to enter the nomination.

* * * * *

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United States Patent [19]

Webster et al.

[11] Patent Number: 5,898,431

[45] Date of Patent: Apr. 27, 1999

[54] **DATABASE GRAPHICAL USER INTERFACE WITH CALENDAR VIEW**

[75] Inventors: **Roger Webster**, San Jose; **Nicholas Lerissa**, San Francisco; **Deborah Magid**, Burlingame; **Bayles Holt**, San Jose; **Nick Durrant**; **Julie Knaggs**, both of San Francisco; **Patrick Young**, Sunnyvale; **Deanna McCusker**, Palo Alto, all of Calif.

[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.

[21] Appl. No.: **08/774,573**

[22] Filed: **Dec. 31, 1996**

[51] **Int. Cl.**[6] **G06F 3/00**

[52] **U.S. Cl.** **345/331**; 345/332

[58] **Field of Search** 345/326, 329, 345/330, 331, 332, 335, 968; 395/968

[56] **References Cited**

U.S. PATENT DOCUMENTS

5,446,842	8/1995	Schaeffer et al.	395/200.35
5,481,666	1/1996	Nguyen et al.	345/357
5,500,929	3/1996	Dickinson	345/356
5,522,066	5/1996	Lu	707/1
5,537,618	7/1996	Boulton et al.	345/326
5,544,302	8/1996	Nguyen	345/326
5,636,350	6/1997	Eick et al.	345/440
5,721,906	2/1998	Siefert	707/9

OTHER PUBLICATIONS

Mark R. Brown, "Using Netscape 2", Que Corporation, pp. 369, 385, 389, and 390, 1995.

Inside Taligent Technology, Sean Cotter et al., Jun. '95, pp. 74–109 and pp. 172–210.

Presentation and Compound Document Framework Concepts, Taligent, Inc. 1995, pp. 1–66.

Desktop Frameworks Concepts, Taligent, Inc. 1995, pp. 1–40.

CommonPoint Application System, Human Interface Guidelines, Taligent, Inc., 1995, pp. 1–79.

Primary Examiner—Raymond J. Bayerl

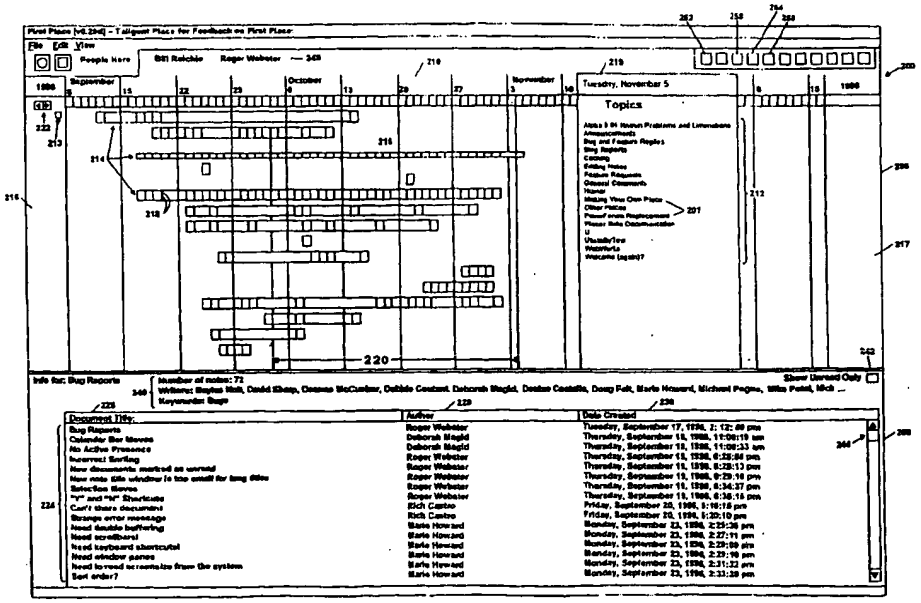
Assistant Examiner—X. L. Bautista

Attorney, Agent, or Firm—Kudirka & Jobse, LLP

[57] **ABSTRACT**

A method and apparatus summarizes information in an easy and user-friendly format in a database that stores topics and responses to those topics. To that end, a graphical user interface is disclosed having a calendar view and an adjacent report view. The calendar view is a two-dimensional grid having a timeline displayed along one dimension, an index listing one or more topics along the other dimension, and indicia displaying the number of responses to each of the listed topics on the each day, week, month, or year designated in the timeline. Selection of the one or more topics displays the title, author, and date of posting of each response to the selected topic in the report view. Selection of the title of one of the responses in the report view, or the indicia in the calendar view, displays the content of the response.

25 Claims, 9 Drawing Sheets



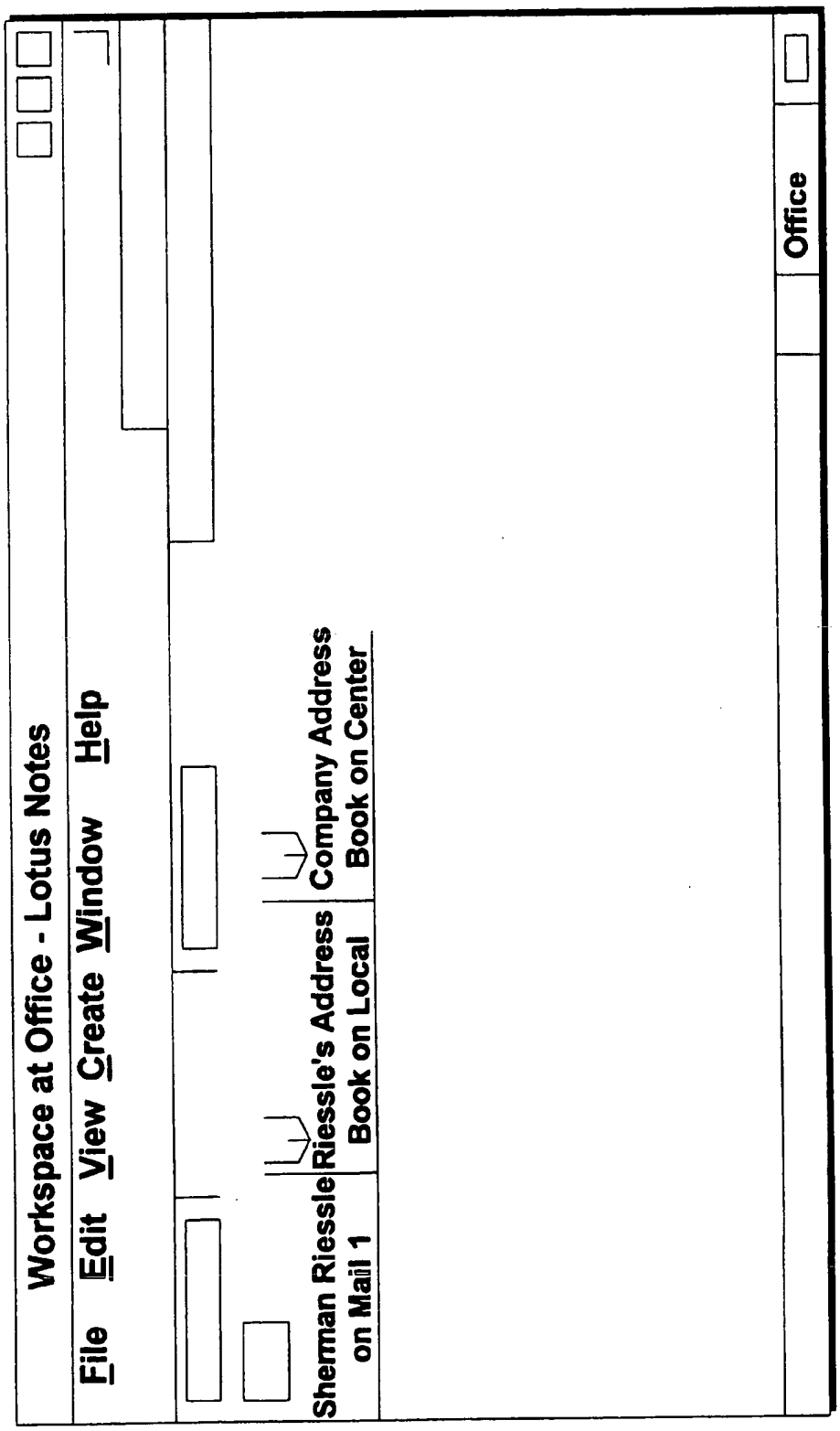

Workspace at Office - Lotus Notes
File Edit View Create Window Help
Sherman Riessle on Mail 1
Riessle's Address Book on Local
Company Address Book on Center
Office

Figure 1

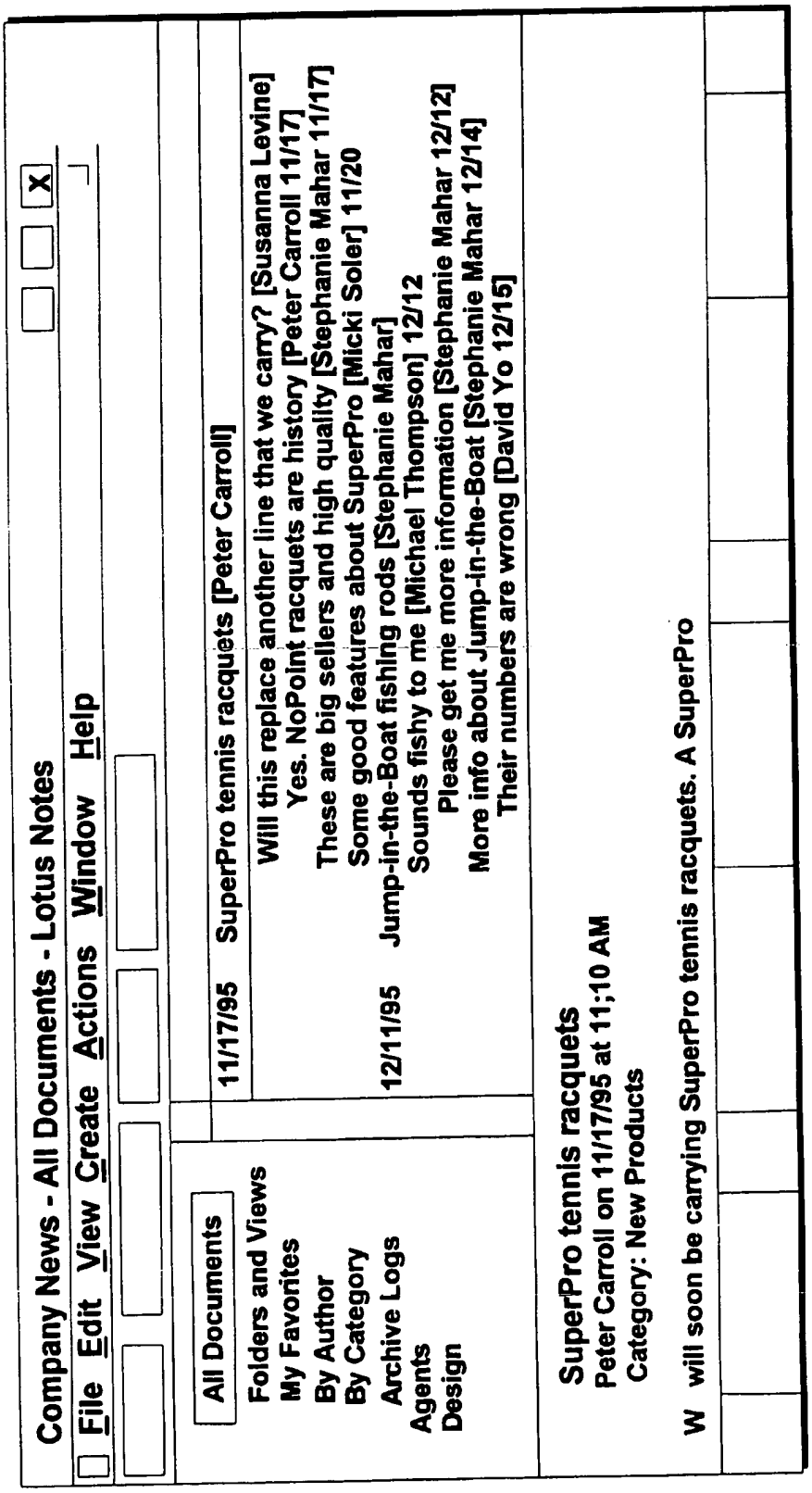

Company News - All Documents - Lotus Notes
File Edit View Create Actions Window Help
All Documents
Folders and Views
My Favorites
By Author
By Category
Archive Logs
Agents
Design
11/17/95 SuperPro tennis racquets [Peter Carroll]
Will this replace another line that we carry? [Susanna Levine]
Yes. NoPoint racquets are history [Peter Carroll 11/17]
These are big sellers and high quality [Stephanie Mahar 11/17]
Some good features about SuperPro [Micki Soler] 11/20
12/11/95 Jump-in-the-Boat fishing rods [Stephanie Mahar]
Sounds fishy to me [Michael Thompson] 12/12
Please get me more information [Stephanie Mahar 12/12]
More info about Jump-in-the-Boat [Stephanie Mahar 12/14]
Their numbers are wrong [David Yo 12/15]
SuperPro tennis racquets
Peter Carroll on 11/17/95 at 11:10 AM
Category: New Products
W will soon be carrying SuperPro tennis racquets. A SuperPro

Figure 2

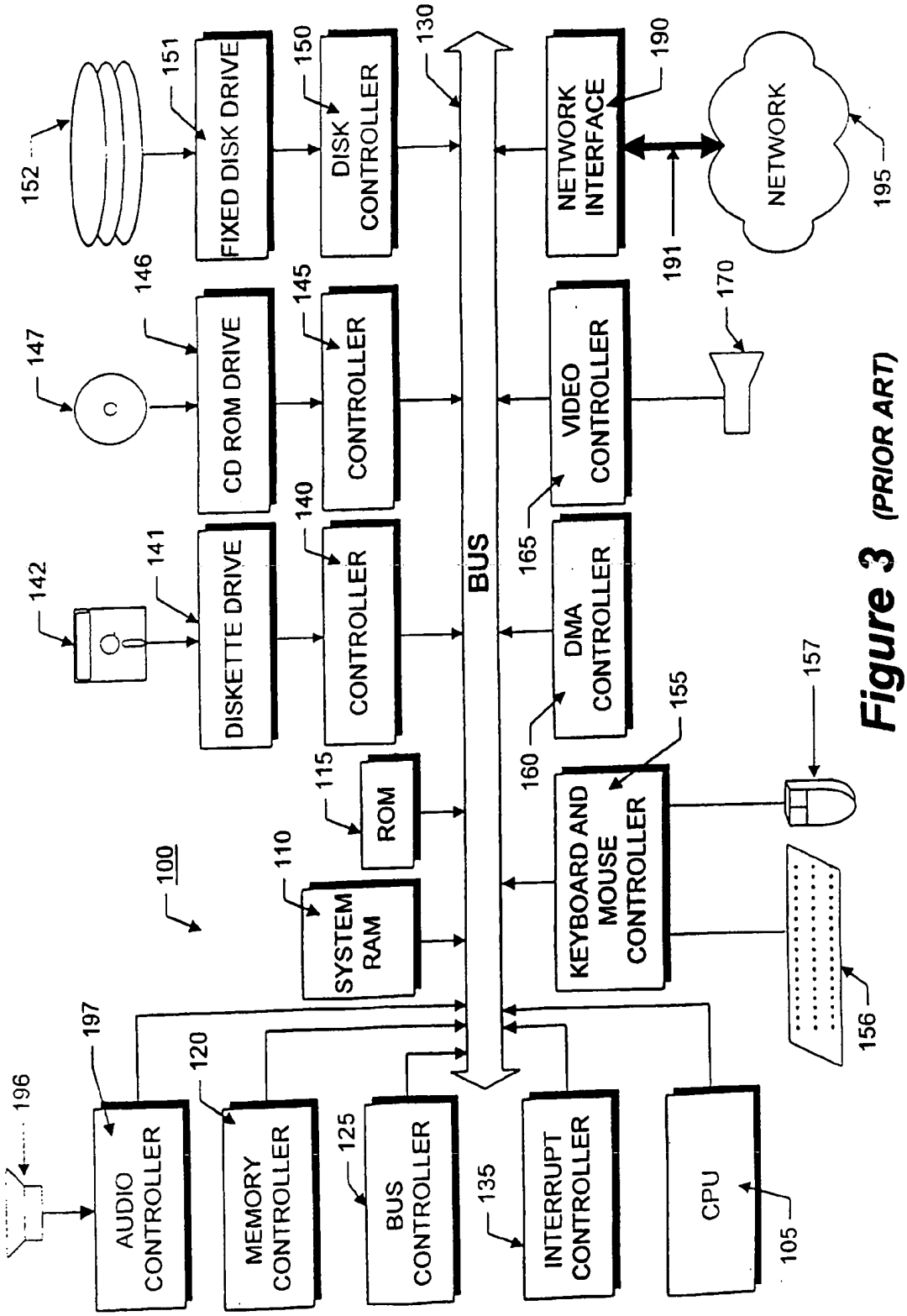
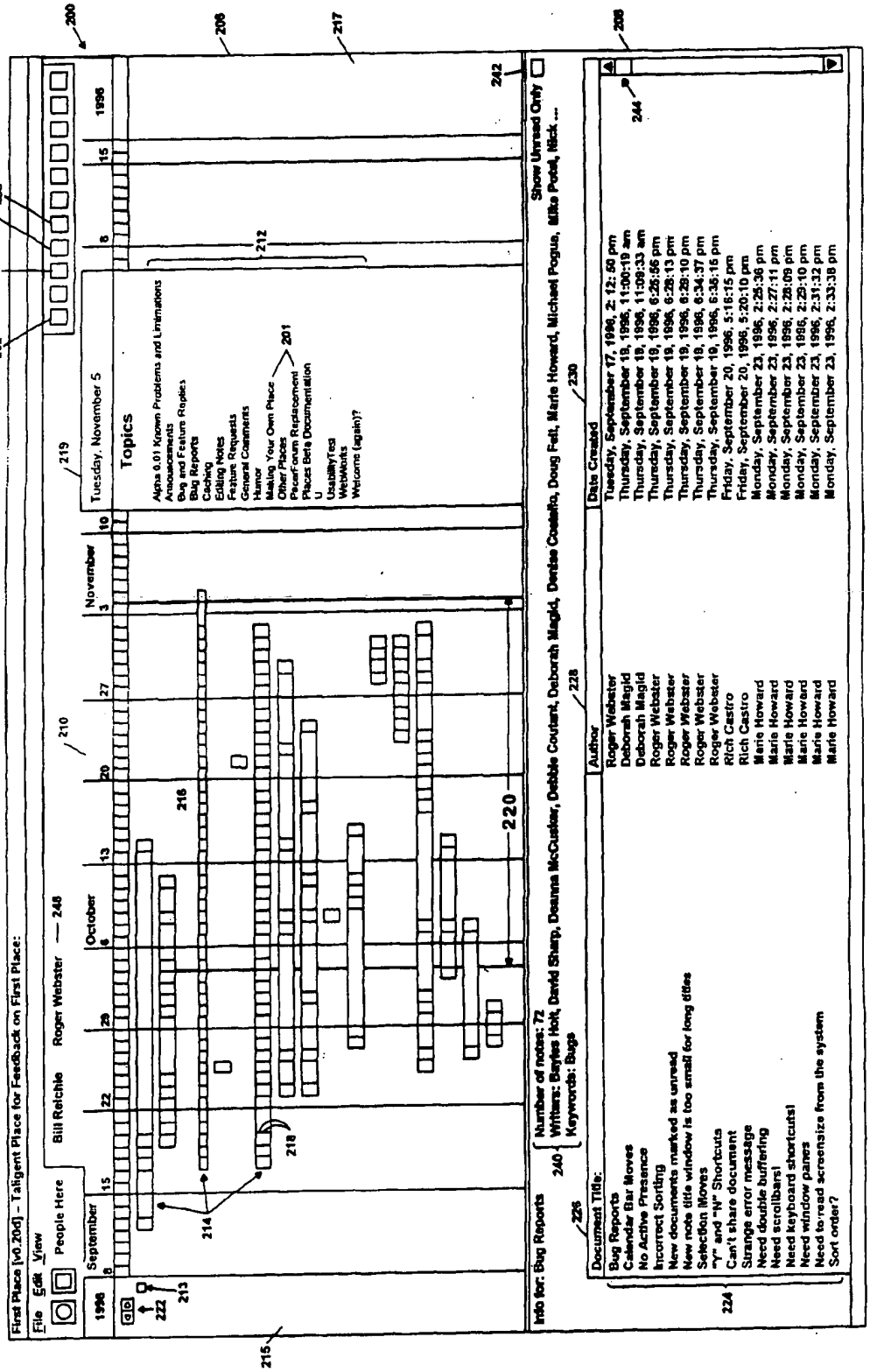


Figure 3 (PRIOR ART)


First Place [v0.20d] - Taligent Place for Feedback on First Place:
File Edit View
People Here
Bill Reichle
Roger Webster
248
September
October
November
1996
Tuesday, November 5
Topics
Alpha 6.01 Known Problems and Limitations
Announcements
Bug and Feature Ropics
Bug Reports
Caching
Editing Notes
Feature Requests
General Comments
Humor
Mailing Your Own Place
Other Places
PlaceForum Replacement
Places Beta Documentation
UI
UsabilityTest
WebWorks
Welcome (again)?
Show Unread Only
Info for: Bug Reports
Number of notes: 72
Writers: Baylee Holt, David Sharp, Deanna McCusker, Debbie Coutant, Deborah Magid, Denise Costello, Doug Fell, Marie Howard, Michael Pogue, Mike Postel, Nick ...
Keywords: Bugs
Document Title:
Author
Date Created
Bug Reports
Calendar Bar Moves
No Active Presence
Incorrect Sorting
New documents marked as unread
New note title window is too small for long titles
Selection Moves
"r" and "N" Shortcuts
Can't share document
Strange error message
Need double buffering
Need scrollbars!
Need keyboard shortcuts!
Need window panes
Need to read screensize from the system
Sort order?
Roger Webster
Deborah Magid
Deborah Magid
Roger Webster
Roger Webster
Roger Webster
Roger Webster
Roger Webster
Rich Castro
Rich Castro
Marie Howard
Marie Howard
Marie Howard
Marie Howard
Marie Howard
Marie Howard
Tuesday, September 17, 1996, 2:12:50 pm
Thursday, September 19, 1996, 11:00:19 am
Thursday, September 19, 1996, 11:09:33 am
Thursday, September 19, 1996, 6:26:56 pm
Thursday, September 19, 1996, 6:28:13 pm
Thursday, September 19, 1996, 6:28:10 pm
Thursday, September 19, 1996, 6:34:37 pm
Thursday, September 19, 1996, 6:36:15 pm
Friday, September 20, 1996, 5:18:15 pm
Friday, September 20, 1996, 5:20:10 pm
Monday, September 23, 1996, 2:25:36 pm
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Monday, September 23, 1996, 2:28:09 pm
Monday, September 23, 1996, 2:29:10 pm
Monday, September 23, 1996, 2:31:32 pm
Monday, September 23, 1996, 2:33:38 pm
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Figure 4

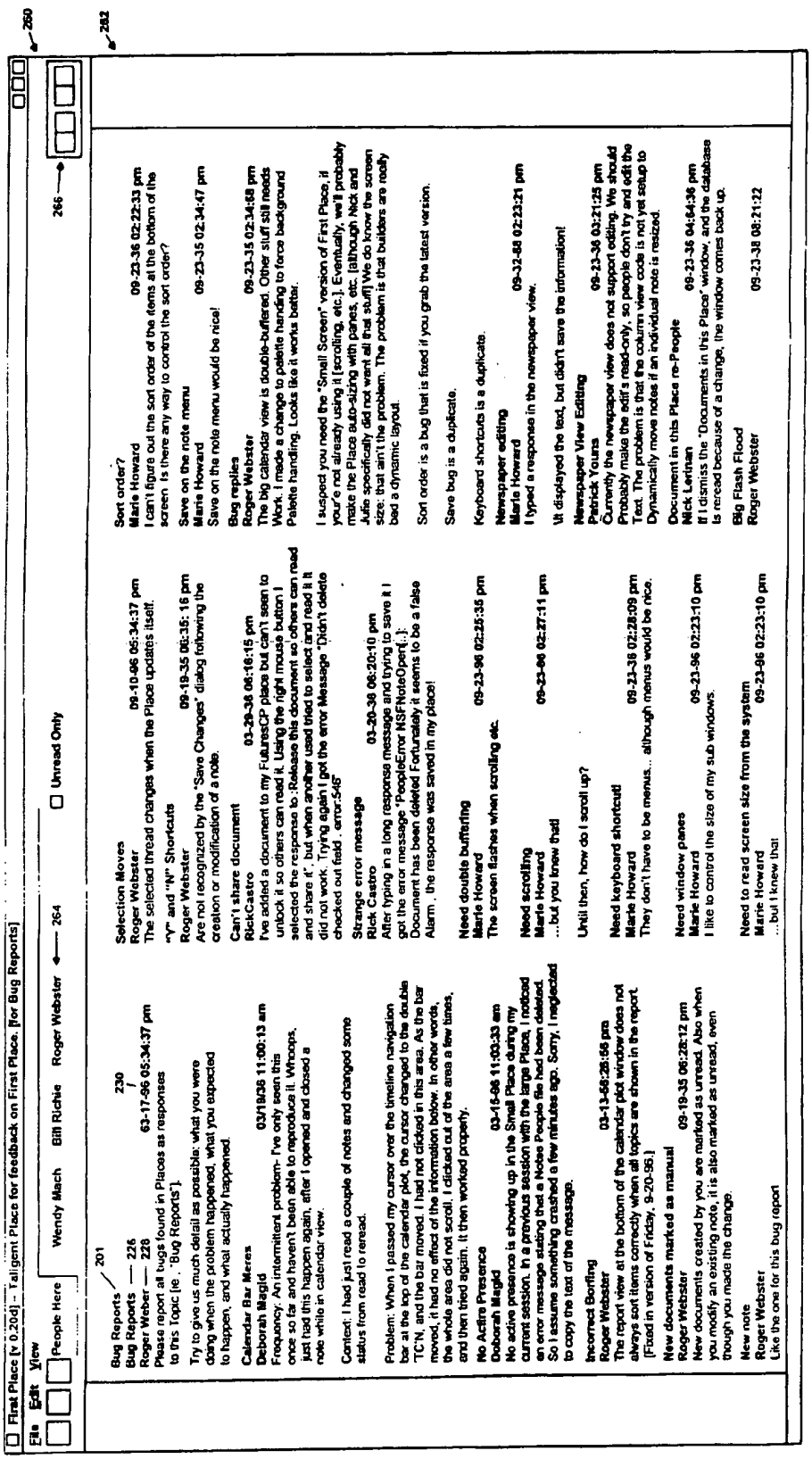
260
252
First Place [v 0.20d] - Tailgent Place for feedback on First Place. [for Bug Reports]
File Edit View
People Here
Wendy Mach
Bill Richie
Roger Webster
264
Unread Only
266
201
Bug Reports 230
Bug Reports — 226
Roger Weber — 228
03-17-96 05:34:37 pm
Please report all bugs found in Places as responses
to this Topic (ie. "Bug Reports").
Try to give us much detail as possible: what you were
doing when the problem happened, what you expected
to happen, and what actually happened.
Calendar Bar Menus
Deborah Magid
03/19/36 11:00:13 am
Frequency: An intermittent problem- I've only seen this
once so far and haven't been able to reproduce it. Whoops,
just had this happen again, after I opened and closed a
note while in calendar view.
Context: I had just read a couple of notes and changed some
status from read to reread.
Problem: When I passed my cursor over the timeline navigation
bar at the top of the calendar plot, the cursor changed to the double
TCN, and the bar moved. I had not clicked in this area. As the bar
moved, it had no effect of the information below. In other words,
the whole area did not scroll. I clicked out of the area a few times,
and then tried again. It then worked properly.
No Active Presence
Deborah Magid
03-16-96 11:03:33 am
No active presence is showing up in the Small Place during my
current session. In a previous session with the large Place, I noticed
an error message stating that a Notes People file had been deleted.
So I assume something crashed a few minutes ago. Sorry, I neglected
to copy the text of the message.
Incorrect Sorting
Roger Webster
03-13-56:26:56 pm
The report view at the bottom of the calendar plot window does not
always sort items correctly when all topics are shown in the report
[Fixed in version of Friday, 9-20-96.]
New documents marked as manual
Roger Webster
09-19-35 06:28:12 pm
New documents created by you are marked as unread. Also when
you modify an existing note, it is also marked as unread, even
though you made the change.
New note
Roger Webster
Like the one for this bug report
Selection Moves
Roger Webster
09-10-96 05:34:37 pm
The selected thread changes when the Place updates itself.
"Y" and "N" Shortcuts
Roger Webster
09-19-35 06:35:16 pm
Are not recognized by the "Save Changes" dialog following the
creation or modification of a note.
Can't share document
RickCastro
03-29-36 06:16:15 pm
I've added a document to my FuturesCP place but can't seen to
unlock it so others can read it. Using the right mouse button I
selected the response to : Release this document so others can read
and share it . but when another used tried to select (and read it) it
did not work. Trying again I got the error Message "Didn't delete
checked out field . error:545
Strange error message
Rick Castro
03-20-36 06:20:10 pm
After typing in a long response message and trying to save it I
got the error message "PeopleError NSFNoteOpen[..]:
Document has been deleted Fortunately it seems to be a false
Alarm . the response was saved in my place!
Need double buffering
Marie Howard
09-23-96 02:25:35 pm
The screen flashes when scrolling etc.
Need scrolling
Marie Howard
09-23-96 02:27:11 pm
...but you knew that!
Until then, how do I scroll up?
Need keyboard shortcut!
Marie Howard
09-23-36 02:28:09 pm
They don't have to be menus... although menus would be nice.
Need window panes
Marie Howard
09-23-96 02:23:10 pm
I like to control the size of my sub windows.
Need to read screen size from the system
Marie Howard
09-23-96 02:23:10 pm
...but I knew that
Sort order?
Marie Howard
09-23-36 02:22:33 pm
I can't figure out the sort order of the items at the bottom of the
screen. Is there any way to control the sort order?
Save on the note menu
Marie Howard
09-23-35 02:34:47 pm
Save on the note menu would be nice!
Bug replies
Roger Webster
09-23-35 02:34:58 pm
The big calendar view is double-buffered. Other stuff still needs
Work. I made a change to palette handing to force background
Palette handling. Looks like it works better.
I suspect you need the "Small Screen" version of First Place, if
your're not already using it [scrolling, etc.]. Eventually, we'll probably
make the Place auto-sizing with panes, etc. [although Nick and
Jufe specifically did not want all that stuff] We do know the screen
size: that ain't the problem. The problem is that builders are really
bad a dynamic layout.
Sort order is a bug that is fixed if you grab the latest version.
Save bug is a duplicate.
Keyboard shortcuts is a duplicate.
Newspaper editing
Marie Howard
09-12-48 02:23:21 pm
I typed a response in the newspaper view.
\it displayed the text, but didn't save the information!
Newspaper View Editing
Patrick Young
09-23-36 03:21:25 pm
Currently the newspaper view does not support editing. We should
Probably make the edit's read-only, so people don't try and edit the
Text. The problem is that the column view code is not yet setup to
Dynamically move notes if an individual note is resized.
Document in this Place re-People
Nick Lerinan
09-23-35 04:54:36 pm
If I dismiss the "Documents in this Place" window, and the database
Is reread because of a change, the window comes back up.
Big Flash Flood
Roger Webster
09-23-38 08:21:22

Figure 5

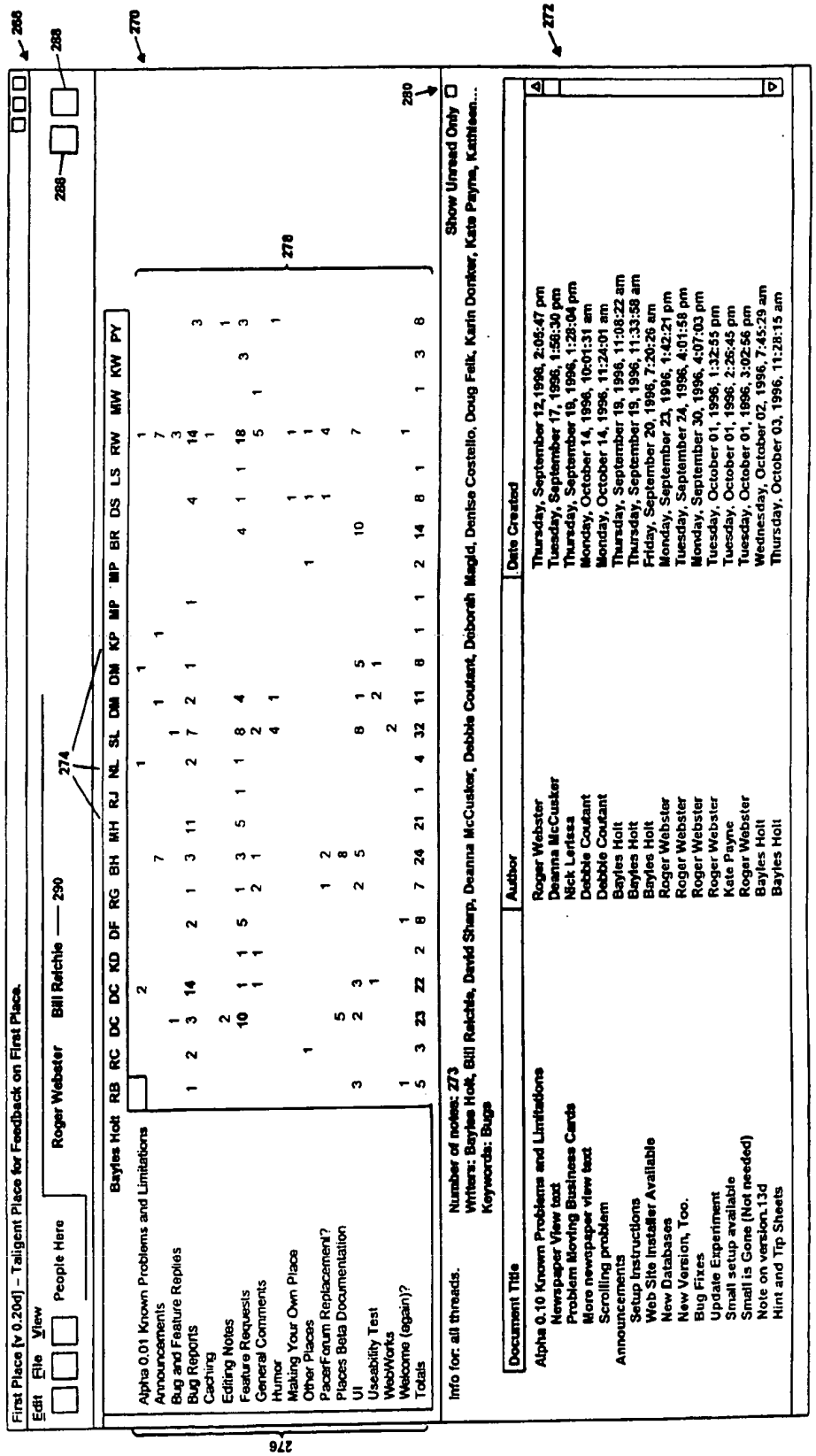
First Place [v 0.20d] - Tailgent Place for Feedback on First Place.
Edit File View
People Here
Roger Webster
Bill Ratchle
Bayles Holt RB RC DC DC KD DF RG BH MH RJ NL SL DM DM KP MP MP BR DS LS RW MW KW PY
Alpha 0.01 Known Problems and Limitations
Announcements
Bug and Feature Replies
Bug Reports
Caching
Editing Notes
Feature Requests
General Comments
Humor
Making Your Own Place
Other Places
PacerForum Replacement?
Places Beta Documentation
UI
Usability Test
WebWorks
Welcome (again)?
Totals
Info for: all threads.
Number of notes: 273
Writers: Bayles Holt, Bill Ratchle, David Sharp, Deanna McCusker, Debbie Coutant, Deborah Magid, Denise Costello, Doug Felt, Karin Donker, Kate Payne, Kathleen...
Keywords: Bugs
Show Unread Only
Document Title
Author
Date Created
Alpha 0.10 Known Problems and Limitations
Roger Webster
Thursday, September 12, 1996, 2:05:47 pm
Newspaper View text
Deanna McCusker
Tuesday, September 17, 1996, 1:58:30 pm
Problem Moving Business Cards
Nick Larissa
Thursday, September 19, 1996, 1:28:04 pm
More newspaper view text
Debbie Coutant
Monday, October 14, 1996, 10:01:31 am
Scrolling problem
Debbie Coutant
Monday, October 14, 1996, 11:24:01 am
Announcements
Bayles Holt
Thursday, September 19, 1996, 11:08:22 am
Setup Instructions
Bayles Holt
Thursday, September 19, 1996, 11:33:58 am
Web Site Installer Available
Bayles Holt
Friday, September 20, 1996, 7:20:26 am
New Databases
Roger Webster
Monday, September 23, 1996, 1:42:21 pm
New Version, Too.
Roger Webster
Tuesday, September 24, 1996, 4:01:58 pm
Bug Fixes
Roger Webster
Monday, September 30, 1996, 4:07:03 pm
Update Experiment
Roger Webster
Tuesday, October 01, 1996, 1:32:55 pm
Small setup available
Kate Payne
Tuesday, October 01, 1996, 2:26:45 pm
Small is Gone (Not needed)
Roger Webster
Tuesday, October 01, 1996, 3:02:56 pm
Note on version 13d
Bayles Holt
Wednesday, October 02, 1996, 7:45:29 am
Hint and Tip Sheets
Bayles Holt
Thursday, October 03, 1996, 11:28:15 am
266
268
270
272
274
276
278
280
288
290

Figure 6

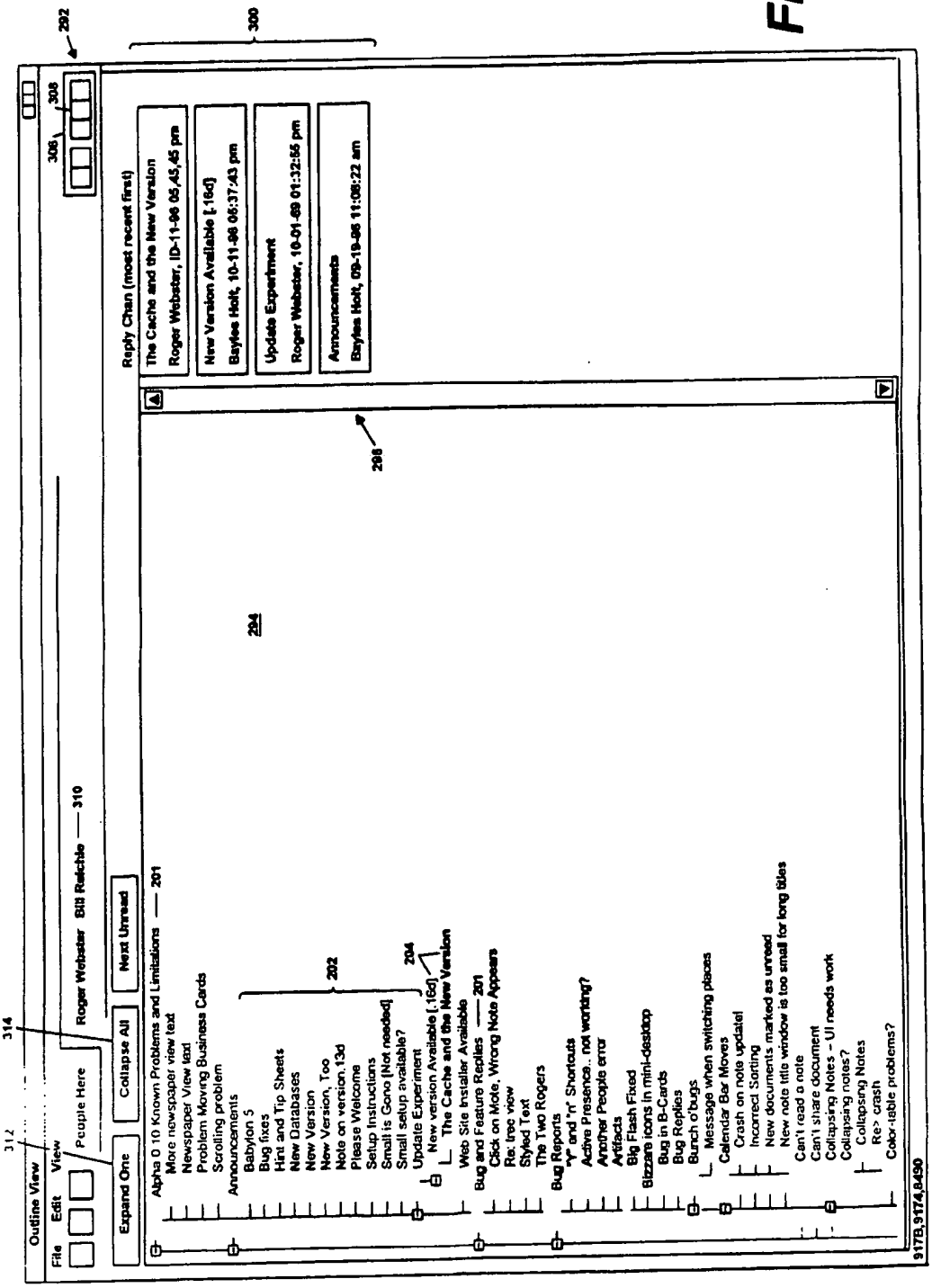
Outline View
File Edit View
People Here
Roger Webster Bill Reichle — 310
Expand One
Collapse All
Next Unread
312
314
292
306
308
300
Reply Chain (most recent first)
The Cache and the New Version
Roger Webster, ID-11-96 05:45:45 pm
New Version Available [.16d]
Baylee Holt, 10-11-96 05:37:43 pm
Update Experiment
Roger Webster, 10-01-69 01:32:55 pm
Announcements
Baylee Holt, 09-19-96 11:08:22 am
298
294
Alpha 0.10 Known Problems and Limitations — 201
More newspaper view text
Newspaper View text
Problem Moving Business Cards
Scrolling problem
Announcements
Babylon 5
Bug fixes
Hint and Tip Sheets
New Databases
New Version
New Version, Too
Note on version.13d
Please Welcome
Setup Instructions
Small is Gone [Not needed]
Small setup available?
202
204
Update Experiment
New version Available [.16d]
The Cache and the New Version
Web Site Installer Available
Bug and Feature Replies — 201
Click on Mote, Wrong Note Appears
Re: tree view
Styled Text
The Two Rogers
Bug Reports
"r" and "n" Shortcuts
Active Presence.. not working?
Another People error
Artifacts
Big Flash Fixed
Bizzare icons in mini-desktop
Bug in B-Cards
Bug Replies
Bunch o'bugs
Message when switching places
Calendar Bar Moves
Crash on note update!
Incorrect Sorting
New documents marked as unread
New note title window is too small for long titles
Can't read a note
Can't share document
Collapsing Notes - UI needs work
Collapsing notes?
Collapsing Notes
Re> crash
Color-table problems?
917B, 9174, 8490

Figure 7A

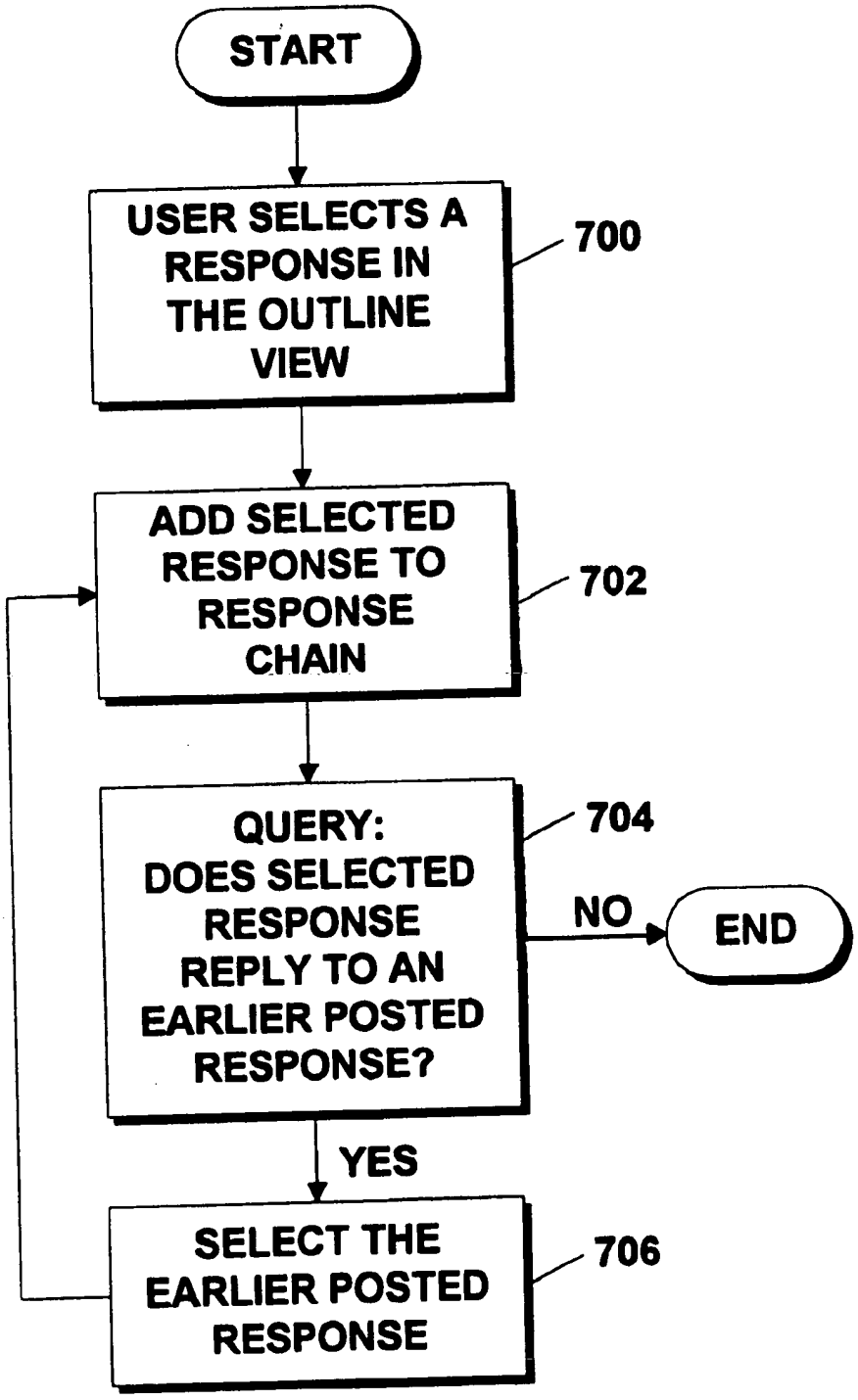
START
USER SELECTS A RESPONSE IN THE OUTLINE VIEW
700
ADD SELECTED RESPONSE TO RESPONSE CHAIN
702
QUERY: DOES SELECTED RESPONSE REPLY TO AN EARLIER POSTED RESPONSE?
704
NO
END
YES
SELECT THE EARLIER POSTED RESPONSE
706

Figure 7B

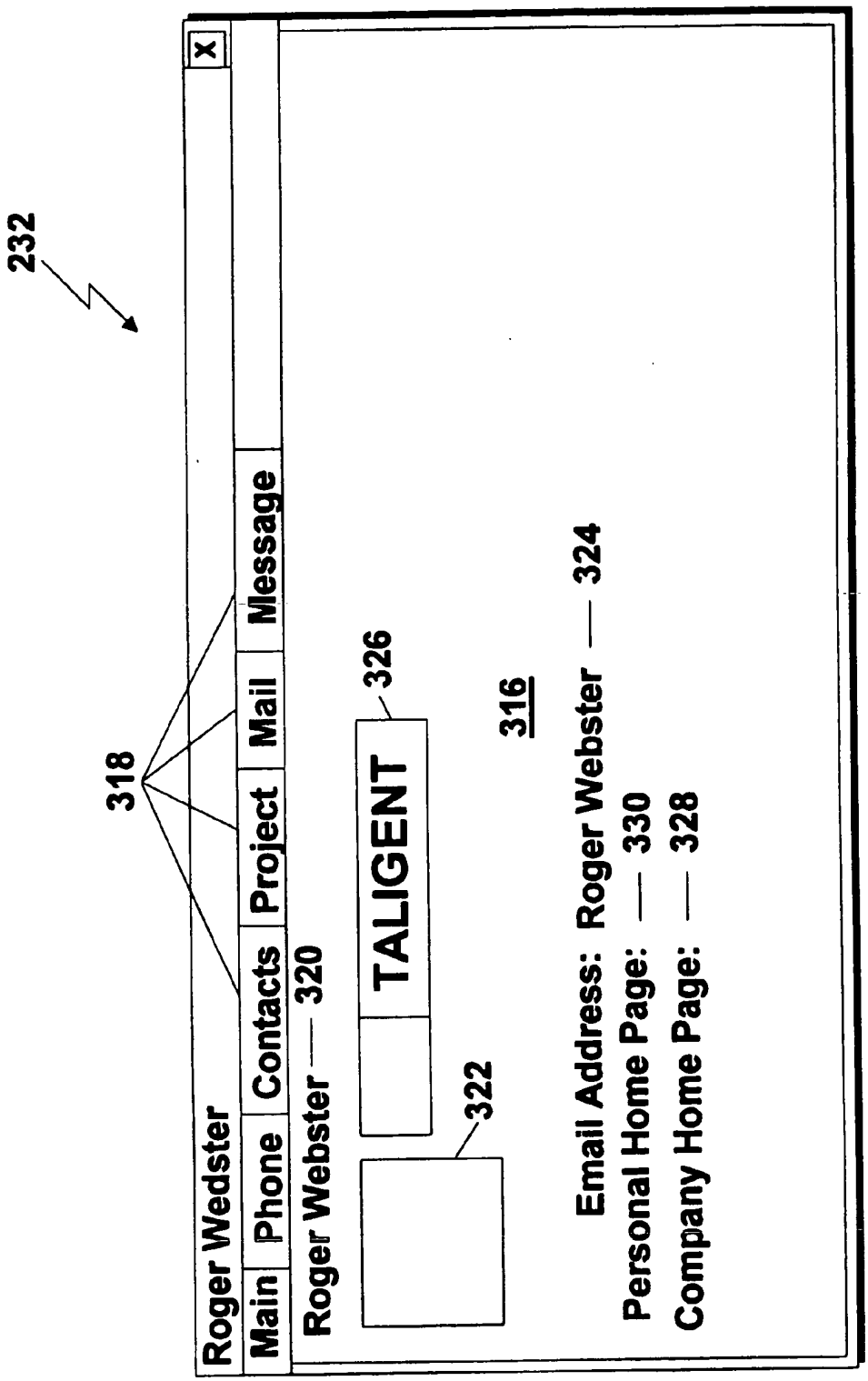
232
318
Roger Wedster
Main
Phone
Contacts
Project
Mail
Message
Roger Webster — 320
TALIGENT
326
316
322
Email Address: Roger Webster — 324
Personal Home Page: — 330
Company Home Page: — 328

Figure 8

DATABASE GRAPHICAL USER INTERFACE WITH CALENDAR VIEW

RELATED APPLICATIONS

This application contains subject matter which is related to the following applications: "Database Graphical User Interface with User Frequency View" (U.S. Ser. No. 08/777,616), "Database Graphical User Interface with Outline View" (U.S. Ser. No. 08/774,572) and "Database Graphical User Interface with Tabbed User View" (U.S. Ser. No. 08/774,576), all filed by Roger Webster and Nicholas Lerissa on an even date herewith and assigned to the present assignee.

FIELD OF THE INVENTION

This invention relates generally to computer databases and, more particularly, to graphical user interfaces for accessing multiple-user databases.

BACKGROUND OF THE INVENTION

Computer systems typically store large collections of data in databases in non-volatile computer memory. Data stored in databases commonly is organized into individual records which themselves are organized in a logical hierarchical manner that simplifies use of that database. Depending upon the database access policy, each record of the database may be accessed, reviewed, modified, or deleted by an authorized database user. When used in a business context for storing information relating to software development by a software development company, for example, data stored in the database may include data relating to projects being developed by the company, comments by employees relating to current technology of the company, and technical data related to ongoing company projects.

Most records in a database are accessible to a user through a "graphical user interface" (GUI). GUIs provide a visual metaphor of a real-world scene, such as a desktop, featuring icons that the user can manipulate with a pointing device, such as a mouse. The database user therefore may access a selected database by clicking on a GUI button representing the database, responsively causing the computer to display the contents of the selected database in an easy to understand format. This format itself is a GUI that enables the user to further access and manipulate the database.

One type of database application program product in widespread use is Lotus Notes™ (Notes), available from Lotus Development Corporation of Cambridge, Mass. Notes enables a user to construct a database that may be accessed by multiple users through a Notes-based GUI. FIGS. 1 and 2 show exemplary Notes GUIs used with a multi-user database that stores topics, responses replying to the topics (topic responses), and responses replying to the responses (reply responses). Notes organizes the data in the exemplary database by grouping the topics, and their corresponding responses, into folders.

The user may access the exemplary Notes database by clicking on a database access button (FIG. 1), which responsively displays the GUI shown in FIG. 2. The GUI in FIG. 2 includes a navigation pane for displaying the folders in the database, a view pane for viewing the topics and titles of the responses stored in the folders listed in the navigation pane, and a preview pane for displaying the content of a response selected in the view pane.

Although the Notes GUI displays some information about the topics and responses, such as the title of a response, date

of the response, and the author of the response, it does not tabulate a summary of this information and other related data. For example, summaries with indicia relating to the number of replies per user per topic are not displayed. Similarly, the Notes GUI does not display indicia or information relating to the number of replies to any one topic on each of several days, weeks, months, or years. Absent a GUI displaying such summaries, a user requiring this information necessarily would be required to manually tabulate these summaries while scrolling through the Notes GUI. Such a process is time consuming and inefficient.

Accordingly, it would be desirable to provide a GUI that summarizes database information in a simple, easy to understand, user-friendly format. It also would be desirable for such a GUI to facilitate user access to the database records directly from the GUI. It is among the general objects of the invention to provide such a device and method.

SUMMARY OF THE INVENTION

In accordance with one aspect of the invention, a multiple user database may be accessed through a GUI which summarizes, in an easy and user-friendly format, the number of responses to any one topic on each of several days, weeks, months, years, or any other time designation. To that end, the GUI includes a calendar view and an adjacent report view. The calendar view is a two-dimensional grid having a timeline along a horizontal dimension, and an index listing a plurality of topics along the vertical dimension. The grid forms a plurality of intersecting horizontal topic rows and vertical time columns. Each intersection of a topic row and time column may include indicia that display the number of responses to the listed topics on the day, week, month, or year designated in a given time column. The report view includes a listing of the titles of each response to a topic selected in the index by a user.

In accordance with another aspect of the invention, the database may be accessed through a GUI which summarizes, in an easy and user-friendly format, the number of responses to a given topic by one or more of a plurality of users. To that end, the GUI includes a user frequency view and an adjacent report view. The user frequency includes a two-dimensional grid having indicia identifying one or more users along the horizontal dimension, and an index listing a plurality of topics along the vertical dimension. Similar to the previously described GUI, the grid forms a plurality of intersecting horizontal topic rows and vertical user identifying columns. Each intersection of a topic row and user identifying column may include indicia that display the number of responses to each of the listed topics by each of the users. The report view includes a listing of the titles of each response to a topic selected in the index, or the titles of each response by a user to a selected topic.

In accordance with yet another aspect of the invention, the database may be accessed by a GUI having an outline view that lists each of the responses under a topic in outline form, and an adjacent response chain view having indicia for accessing the content of each response in a response chain (described below) to a selected response. A response may either be a response to a topic (topic response) or a response to a previously posted response (reply response). The response chain therefore includes a selected response and any other responses that are directly linked, by responses, between the selected response and the topic.

In accordance with still another aspect of the invention, each of the above-mentioned inventive GUIs includes

graphical indicia indicating which users are simultaneously viewing the GUI. The indicia may be colored text.

In accordance with another aspect of the invention, the GUI displays information relating to a database user and includes means for connecting to the Internet and, in particular, to the user's world wide web home page. To that end, the GUI includes a display view having indicia related to the user, and a plurality of tabs adjacent to the display view for changing the indicia in the display view. Among the indicia in the display view is text identifying the world wide web home page address for the user. Clicking on the world wide web address causes the computer to directly connect to the user's home page.

It is among the objects of the invention to provide an apparatus and method that simplifies access to a database.

It is another object of the invention to provide an apparatus and method that summarizes database information in an easy, user-friendly format.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects and advantages of the invention will be appreciated more fully from the following further description thereof with reference to the accompanying drawings wherein:

FIG. **1** is an illustration of a prior art Notes GUI for accessing a Notes database;

FIG. **2** is an illustration of a prior art Notes GUI displaying the contents of a Notes database;

FIG. **3** is a block diagram of a computer system suitable for use with the present invention;

FIG. **4** is an illustration of a first database GUI having a calendar view and a report view;

FIG. **5** is an illustration of a second database GUI having a response content view;

FIG. **6** is an illustration of a third database GUI having a user frequency view and a report view;

FIG. **7A** is an illustration of a fourth database GUI having an outline view and a response chain view;

FIG. **7B** is a flow chart illustrating the process of forming a response chain; and

FIG. **8** is an illustration of a fifth database GUI having a display view showing the world wide web home page address for a user.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

FIG. **3** illustrates the system architecture for an exemplary computer system **100**, such as an IBM PS/2® computer, on which the invention can be implemented. The exemplary computer system of FIG. **3** is for descriptive purposes only and should not be considered a limitation of the invention. Although the description below may refer to terms commonly used in describing particular computer systems, such as an IBM PS/2 computer, the described concepts apply equally to other systems, including systems having architectures that are dissimilar to that shown in FIG. **3**.

The computer system **100** includes a central processing unit (CPU) **105**, which may include a conventional microprocessor, random access memory (RAM) **110** for temporary storage of information, and read only memory (ROM) **115** for permanent storage of information. A memory controller **120** is provided for controlling system RAM **110**. A bus controller **125** is provided for controlling bus **130**, and an interrupt controller **135** is used for receiving and processing various interrupt signals from the other system components.

Mass storage may be provided by diskette **142**, CD-ROM **147**, or hard disk **152**. Data and software may be exchanged with computer system **100** via removable media, such as diskette **142** and CD-ROM **147**. Diskette **142** is insertable into diskette drive **141**, which is connected to bus **130** by controller **140**. Similarly, CD-ROM **147** is insertable into CD-ROM drive **146**, which is connected to bus **130** by controller **145**. Finally, a hard disk **152** is part of a fixed disk drive **151**, which is connected to bus **130** by controller **150**.

User input to computer system **100** may be provided by a number of devices. For example, keyboard **156** and mouse **157** are connected to bus **130** by keyboard and mouse controller **155**. An audio transducer **196**, which may act as both a microphone and a speaker, is connected to bus **130** by audio controller **197**. It should be obvious to those reasonably skilled in the art that other input devices such as a pen and/or tablet and a microphone for voice input may be connected to computer system **100** through bus **130** and an appropriate controller. DMA controller **160** is provided for performing direct memory access to system RAM **110**. A visual display is generated by a video controller **165**, which controls video display **170**. Computer system **100** also includes a communications adapter **190** which allows the system to be interconnected to a network **195** via bus **191**. The network **195** may be a local area network (LAN) or a wide area network (WAN).

Computer system **100** is generally controlled and coordinated by operating system software, such as the OS/2® operating system (available from the International Business Machines Corporation, Boca Raton, Fla.) or WINDOWS® NT (available from Microsoft Corp., Redmond, Wash.). Among other computer system control functions, the operating system controls allocation of system resources and performs tasks such as process scheduling, memory management, networking and I/O services.

FIG. **4** shows a first GUI **200** for displaying information stored in an exemplary Notes database. The exemplary Notes database stores a plurality of topics **201** and responses to those topics **201** by a plurality of users of that database. As shown in FIG. **4**, such topics **201** may include, "Announcements," "Bug Reports," and "Humor." Users may post responses either directly to topics **201** (topic responses **202**) or indirectly to topics **201** by replying to earlier posted responses (reply responses **204**). For example, a topic response **202** entitled, "Calendar Bar Moves" was posted by Deborah Magid on Sep. 19, 1996 in response to the topic **201**, "Bug Reports." Similarly, a reply response **204** was posted by Roger Webster on Sep. 20, 1996 entitled, "Incorrect Sorting." As shown in FIG. **5** (discussed in detail below), each response includes the title of the response, the author, the time the response was posted, and text conveying the substance of the response. Any user may post a response any number of times on a given day.

The database may be created according to known methods. The exemplary Notes database, for example, may be a relational database having a plurality of responses (i.e. records) with multiple fields. These fields may include:

author of response;

title of the response;

topic being responded to;

date and time of creation of response;

title of earlier response being responded to, if any; and

text written by author.

When creating a new record (i.e. response), the author enters the title of the response and the text. Notes automatically enters the remaining fields into the record.

The exemplary Notes database may be accessed simultaneously by a plurality of users. Accordingly, the first GUI **200** may be accessed and displayed on the display **170** by any of those users simultaneously. To that end, a second (non-relational) database is used by the invention to store information about such database users. This non-relational database may include a record type defined as "active presence," having a single field that stores an identification string identifying each of the users having the first GUI **200** displayed on their displays **170**. A user's identification string is entered into the second database once the first GUI **200** is displayed on that user's display **170**. That user's identification string is deleted from the second database once the first GUI **200** is not displayed on that user's display **170**.

As noted above, the first GUI **200** (FIG. **4**) displays information related to the exemplary database in an easy, user friendly format. Specifically, the first GUI **200** graphically displays the number of responses that were posted to each of the topics **201** on each day of a selected time period. For example, the first GUI **200** graphically indicates that the topic **201** "Bug Reports" had one response posted on Sep. 17, 1996, six responses posted on Sep. 19, 1996, two responses posted on Sep. 20, 1996, etc . . . To effectuate this functionality, the first GUI **200** includes a calendar view **206** and an adjacent report view **208**. The calendar view **206** is a two-dimensional grid having a timeline **210** along the horizontal dimension, an index **212** listing a plurality of topics **201** along the vertical dimension, and a plurality of horizontal markings **214**. The horizontal markings **214** have one or more darkened rectangular boxes **216** aligned with the intersection of a topic **201** and a date. For example, the topic **201** "Bug and Feature Replies" has a first box lined up with Oct. 22, 1996, a second box lined up with Oct. 23, 1996, and a third darkened box lined up with Oct. 25, 1996. This alignment visually indicates that at least one response was posted to that topic **201** on those dates. No responses were posted to that topic **201** on any other days. The darkened boxes **216** also include lines **218** to visually indicate the number of responses on a given day. In the exemplary database, the number of responses is equal to one more than the number of lines **218** within each box so that the box is broken into a number of sub-boxes which equal the number of responses. For example, the topic **201** "Bug and Feature Replies" received one posting on Oct. 22 and 25 of 1996 (i.e. no lines **218** in the box **216**), and three postings on Oct. 23, 1996 (two **218** in the box). Although rectangular boxes **216** with lines **218** are shown, any indicia may be used that effectuates the purpose of the first GUI **200**.

The timeline **210** can be scrolled infinitely into the past and future. This is useful when a second, older database is combined with the exemplary database. When scrolling the timeline **210**, responses that pass out of the field of view are graphically displayed as flags **213** that may be displayed either in a past space **215** or in a future space **217** on the calendar view **206**. Clicking on one of the flags causes the computer to display a listing, in front of the calendar view **206**, of the responses represented by the selected flag **213**. The listing may include the author **228**, title **226**, and posting date **230** of each of the represented responses. Selection of one of the represented responses causes the timeline **210** to display the time period around the posting date of the selected represented response. Subsequent selection of a "today's date" button **219** returns the timeline **210** to the current date.

The calendar view **206** also may include two vertical lines **220** to visually block off a preselected block of time. As shown in FIG. **4**, this block of time may be one month. Scroll buttons **222** may also be included to scroll the timeline **210**.

Any one of the topics **201** listed along the vertical dimension of the calendar view **206** may be selected to display a list **224**, in the report view **208**, of each response posted to the selected topic **201**. Accordingly, the report view **208** includes headings for listing the title **226**, author **228**, and creation date **230** of each response to the selected topic **201**. When any one of the listed authors' names is clicked in the report view **208**, a second GUI **232** having information about the selected author (FIG. **8**, discussed below) will appear in front of the first GUI **200**. The report view **208** also includes indicia **240** indicating the number of responses to the topic **201**, the names of all authors who responded to the topic **201**, and any keywords that may have been used. An unread only button **242** may also be included to display unread responses only. Response scroll buttons **244** may also be included to scroll through the responses listed in the report view **208**.

The first GUI **200** further includes a listing of each user currently having the first GUI **200** displayed on their displays **170**. This listing is displayed in an active presence view **248** on the first GUI **200** which begins with the text "People Here." The first GUI **200** obtains this information from the active presence records in the second database. The letters of the user's names may also be colored to indicate whether the first GUI **200** is in the foreground of the user's display **170**. In the preferred embodiment, a user's name is displayed with red letters when the first GUI **200** is in the foreground, and black letters when the first GUI **200** is not in the foreground.

A means for displaying a summary of all responses posted on a specified date to a selected topic may be included in the first GUI **200**. To that end, an enable button (not shown) may be included on the first GUI **200** that causes a response list window (not shown) to be displayed over the first GUI **200** when the cursor is passed over one of the darkened boxes **216** for a selected topic. The response list window may include the title **226** and author **228** of each response posted on that selected date. Double clicking on one of the responses listed in the response list window causes the user's computer system **100** to display the entire response over the first GUI **200**.

The first GUI **200** may also include a plurality of buttons **252** to perform miscellaneous functions. For example, several buttons can be included to move to another GUI for that database, or to a GUI for another database. Similarly, buttons **254**, **256** for creating a new topic **201** or a new response can also be included. A search button **258** may also be included to search for keywords in the titles of the responses.

During installation, one or more people may be assigned duties within the exemplary database. For example, one person may be assigned the duty of "administrator" to update and trouble-shoot problems with the exemplary database, and another person may be assigned the duty of "response reviewer" to review responses for content and relevance to particular projects. The duties are stored in a duty database, created upon installation of the exemplary database, which may include the fields "name" and "duty to be performed by named person." The duty database may be accessed by known means for review or modification by authorized users.

Each of the responses shown in the first GUI **200** may be directly accessed either by clicking on a response title listed

in the report view **208**, or by clicking on one of the darkened rectangular boxes **216** on the calendar view **206**. This causes a third GUI **260** to be displayed in front of the first GUI **200**. As shown in FIG. **5**, the third GUI **260** includes a response view **262** and an active presence view **264**. The active presence view **264** shows the users displaying the third GUI **260**. The function and operation of the third GUI active presence view **264** are identical to those of the active presence view **248** in the first GUI **200**. The response view **262** includes the title, author, posting date, posting time, and content of each selected response(s). Preferably, the content of the selected responses cannot be edited unless the user viewing the third GUI **260** is the author of the posted response. The content of certain selected response may be omitted, however, to display the title, author posting date and posting time only. This is useful in a number of instances, such as when one or more of the responses had already been read by the user accessing the third GUI **260**. A plurality of buttons **266** similar to those in the first GUI **200** may also be included to increase the functionality of this GUI.

A user may scroll through the responses displayed in the response view **262** in accordance with any method known in the art. It is preferred that the responses be scrolled in a "serpentine" manner in which each column scrolls into the adjacent column as the display is scrolled. For example, with reference to FIG. **5**, when the left column (i.e. having the heading "Bug Reports") is scrolled upwardly by one response, the response at the top of the center column will be moved to the bottom of the left column. The response at the top of the right column consequently will move to the bottom of the center column. Each of the other responses will similarly move upwardly by one response. The response view **262** also may be scrolled on a column by column basis, or on a page by page basis.

The display of responses in the response view **262** may be customized to display selected groups of responses. To that end, means are included for displaying responses having common posting dates **230** for a selected topic, authors **228**, and topics. For example, double-clicking on one of darkened boxes **216** (in the calendar view **206**) will group according to responses to a selected topic on a specific date. As further examples, double-clicking on a date in the timeline **210** will group according to common posting dates **230**, and double-clicking on an author's name in a fourth GUI **268** (discussed in detail below) will group according to one of the author's names.

FIG. **6** shows the fourth GUI **268** that summarizes, in an easy and user-friendly format, the number of responses to each of the topics **201** by each of the users. To that end, the fourth GUI **268** includes a user frequency view **270** and an adjacent report view **272**. The user frequency view **272** is a two-dimensional grid having the initials **274** of each of the users along the horizontal dimension, and a listing **276** of the topics **201** along the vertical dimension. A plurality of numbers **278**, each representing the number of responses to a topic **201** by a user, are positioned at the intersection of the initials **274** and the topics **201**. For example, user "RB" posted one reply to the topic **201** "Bug Reports," three replies to topic **201** "UI," and one reply to topic **201** "Welcome (again)?." The numbers **278** can also have a colored background to visually indicate more or less usage by a user. In the preferred embodiment, the background successively changes from white (lowest), to yellow (low medium), then to orange (high medium), and finally to red (highest) as the number of responses increases.

Similar to the report view **208** in the first GUI **200**, the report view **272** in the fourth GUI **268** lists the title of selected responses, their authors, and the date and time that those responses were posted. In the preferred embodiment, those selected responses are selected by the user when one of the numbers **278** in the grid is clicked. This causes all of the responses represented by that number to be listed in the report view **272**. For example, if the number "2" is double clicked under the initials **274** "DC," the two responses posted by user "DC" in reply to the topic **201** "Alpha 0.10 Known Problems and Limitations" will be listed in the report view **272**.

The report view **272** in the fourth GUI **268** has a number of functions and features that are identical to those in the first GUI report view **208**. A first such function is effectuated when an author's name is double-clicked, causing the second GUI **232** (FIG. **8**) to be displayed in front of the fourth GUI **268**, thus displaying information related to the selected author. A second function is effectuated when the title of the response is double-clicked, causing the third GUI **260** (FIG. **5**) to appear showing the content of the response. An unread only button **280** that causes the report view **272** to show only unread responses also may be included. Further, like the first GUI report view **208**, the number of responses, writers of the notes, and keywords may be displayed in the fourth GUI report view **272**.

Like the first GUI **200**, the fourth GUI **268** may also include a plurality of buttons (not shown) to perform miscellaneous functions. For example, several buttons can be included to move to another GUI. Similarly, buttons **286**, **288** for creating a new topic or a new response may also be included. An active presence view **290** showing users displaying the fourth GUI **268** may also included. The function and operation of the fourth active presence view **290** are identical to those of the active presence view **248** in the first GUI **200**.

FIG. **7A** shows a fifth GUI **292** having an outline view **294** that lists each of the responses in the database under the topic **201** to which they respond. Specifically, the topics **201** listed in the outline view **294** are not indented while topic responses **202** are indented one unit to the right more than the topics **201**. Similarly, reply responses **204** are grouped under the previously posted responses to which they respond (parent responses) and are indented one unit to the right more than their respective parent responses. This format enables a user to quickly and easily differentiate between topic responses **202** and reply responses **204**. It also visually indicates the relationship between different responses in the database.

The fifth GUI **292** also has a button view **296** having buttons **300** for accessing each response in a selected response chain. FIG. **7B** details the process of forming a response chain. Specifically, a response is selected by a user in the outline view **294** at step **700**. This selected response is added to the response chain at step **702**. If the selected response is not a reply to an earlier posted response, the process is ended, thus yielding the fully formed response chain (step **704**). If the selected response is a reply to an earlier posted response, that earlier selected response is selected at step **706** and fed back to step **702**. This process continues until the response chain is fully formed. After the response chain is fully formed, a button **300** for each response in the response chain are formed in the button view **296**. Clicking on one of the buttons **300** causes the computer to display the response whose title is displayed on the button **300**.

Like the first GUI **200**, the fifth GUI **292** may also include a plurality of other buttons to perform miscellaneous functions. For example, several buttons (not shown) can be

included to move to another GUI. Similarly, buttons **306**, **308**, and **309** for creating a new topic **201**, a new topic response **202**, or a new reply response **204** may also be included. An active presence view **310** showing users displaying the fifth GUI **292** may also included. The function and operation of the fifth active presence view **310** are identical to those in the first GUI **200**. The fifth GUI **292** may also have expand and collapse buttons **312**, **314** to expand or collapse the listing of responses in the outline view **294**.

As previously noted, the second GUI **232** (FIG. **8**) is displayed when an author's name is double clicked in either the first GUI report view **208** or the fourth GUI report view **272**. The second GUI **232** both displays information related to the selected author, and enables the selecting user to send an electronic message to the selected author. To that end, the second GUI **232** includes a display view **316** and a plurality of labeled tabs **318** adjacent to the display view **316**. When a tab is clicked, the display view **316** displays indicia that is related to the clicked tab label. For example, as shown in FIG. **8**, the preferred embodiment includes the tabs **318** "main," "phone," "contacts," "project," "mail," and "message." Each of these tabs **318** provides indicia related to the labeled topic **201**. The indicia may be buttons or other indicia that have a preselected function when clicked.

In the preferred embodiment (FIG. **8**), when the "main" tab is selected, the computer displays the author's name **324**, picture **322**, email address **324**, company logo **326**, company world wide web home page address **328**, and personal world wide web home page address **330**. This information is stored in a Notes-based global address book database which is created when the Notes system is installed. The address book database includes information for display by each of the tabs. Clicking on either of the world wide web home page addresses **328**, **330** causes the computer to connect directly to the selected world wide web home page. This connection is made through conventional means. The "phone," "contacts," and "project" tabs **318** respectively include indicia related to the author's various business and personal phone numbers (and fax numbers), relatives of the author to contact in an emergency, and company projects involving the author. The "mail" tab displays the electronic mail in the author's electronic mailbox queue.

The second GUI **232** may be customized by known methods, such as a Wizard program that guides a user through setting and/or modifying the display of that user's data in the second GUI. The user may therefore add and/or move images, logos, personal or professional data, and other information as desired.

An electronic message may be sent to the author by selecting the "message" tab. This causes the computer to display an electronic mail template having a message space for the user to enter a text message. After entering a text message, the user sends the message to the author by conventional means. Since both the source and destination of the electronic mail message are known, both are automatically entered into the message for transmission to the author. After the message is sent, it is temporarily stored in the second database as a data type "message" having fields "to," "from," and "body of message." The next time either of the first, second, third, fourth, or fifth GUIs are displayed by the author's computer, the message will be transmitted to and displayed by the author's display **170**. The message record is deleted from the second database after receipt of the message by the author. If any one of the inventive GUIs are displayed by the computer when the message is sent, it is expected that the message will be displayed by such author's computer within two to three seconds of transmission.

The message tab also includes means for sending instant messages to an author's display **170**. After being sent, instant messages are displayed immediately (i.e., within two to three seconds) on the receiving author's display **170**. In the event that the receiving author is not accessing the exemplary database, the instant message will be displayed immediately after the receiving author subsequently accesses the exemplary database. Like the previously discussed electronic messages, after selecting the message tab, the computer displays an electronic mail template having a message space for the user to enter a text message. Since both the source and destination of the instant message are known, both are automatically entered into the message for transmission to the selected author. After entering the text message and selecting a "send instant message" command button, the text message is displayed on the receiving author's display immediately, or immediately after receiving author's subsequent access into the exemplary database. After selecting the send instant message command button, the instant message is temporarily stored in the second database, until deleted by the receiving author, as a data type "message" having fields "to," "from," and "body of message." Unlike the previously discussed electronic messages, an instant message does not require a receiving author to check an electronic mailbox for messages.

Instant messages may also be sent to any number of users currently using the exemplary database. To that end, the electronic mail template may include an "additional users" space for directing the instant message to additional users of the exemplary database. User's names may be entered into the additional users space to direct the instant message to the preselected additional users. Names entered into the additional users space are automatically entered into the field "to" in the second database.

Each database having topics, topic responses **202**, and reply responses **204** has a set of the previously discussed inventive GUIs for their access. Although a Notes-based database was discussed in connection with the invention, any known database application program product may be used in connection with the inventive GUIs. The database may reside on a server in a local area network, or on a remote storage site that is accessible through the Internet.

The invention may be used with many different types of databases having different proprietary formats by means of a database interface module. Such types of databases may be accessed through the Internet. Among other advantages, the interface module enables the invention to be updated without requiring the updating code to be directed to every different type of database that may be accessed. The interface module may be considered to be a means for iterating through both file system entities (e.g., volumes, directories, and files) and database records from a wide range of different proprietary databases. To that end, the interface module includes a code library that is implemented as a dynamic link library ("DLL"). The DLL creates a two-dimensional table, from the information in the databases being accessed, that is in a form readable to the invention. The rows of the two-dimensional table are either database records or file system entities, and the columns are, respectively, either database fields or file system attributes. The table is formed from input data that may be either a PDS file for database records and file system entities, or a path to a file system directory for file system entities only. A PDS file is a file (with a .pds extension) containing information that allows the DLL to establish a data source (i.e. the two-dimensional table) for either file system entities or database records. The contents of a PDS file are known in the art.

The protocol for establishing a data source (i.e. the two-dimensional table) from a data source specification is as follows:

OpenDataSource: takes a fully-qualified path to either a PDS file or a directory, and returns a "handle" for use in subsequent conversations with the library;

CloseDataSource: takes a handle to a previously opened data source and frees all resources associated with the Data Source;

FirstRow: takes a handle to a previously opened data source; moves the internal table row index to the beginning of the data source; returns true if successful;

NextRow: takes a handle to a previously opened data source; moves the internal table row index to the next logical record in the data source; returns true if successful;

Columns: takes a handle to a previously opened data source; returns the number of columns available;

Rows: takes a handle to a previously opened data source; returns −1 for database data sources (since the total number of records is often not known until the database has been completely iterated through), and the actual number of rows in a file system data source;

Column: takes a handle to a previously opened data source, the index of the column of interest, and a pointer to a string to be filled in with the result;

ColumnType: takes a handle to a previously opened data source and the index of the column of interest; returns a type code indicating the actual type of the data in the specified column;

DisplayColumnName: takes a handle to a previously opened data source and the index of the column of interest; in the case of a database data source, a configuration-time supplied user-friendly name field is returned (this info is stored in the PDS). In the case of a file system data source, the field names are TBD.

ActualColumnName: takes a handle to a previously opened data source and the index of the column of interest; in the case of a database data source, the actual name of the database field is returned (this information is stored in the PDS). In the case of a file system data source, this call returns the same information as DisplayColumnName.

In an alternative embodiment, the interface module also may be, for example, the record maintenance interface disclosed in U.S. Pat. No. 5,522,066 (Liu), the disclosure of which being incorporated herein by reference, in its entirety.

In another alternative embodiment, the invention may be implemented as a computer program product for use with a computer system. Such implementation may include a series of computer instructions fixed either on a tangible medium, such as a computer readable media (e.g. diskette **142**, CD-ROM **147**, ROM **115**, or fixed disk **152** as shown in FIG. **3**) or transmittable to a computer system, via a modem or other interface device, such as communications adapter **190** connected to the network **195** over a medium **191**. Medium **191** may be either a tangible medium (e.g., optical or analog communications lines) or a medium implemented with wireless techniques (e.g., microwave, infrared or other transmission techniques). The series of computer instructions embodies all or part of the functionality previously described herein with respect to the invention. Those skilled in the art should appreciate that such computer instructions can be written in a number of programming languages for use with many computer architectures or operating systems. Furthermore, such instructions may be stored in any memory device, such as semiconductor, magnetic, optical or other memory devices, and may be transmitted using any communications technology, such as optical, infrared, microwave, or other transmission technologies. It is expected that such a computer program product may be distributed as a removable media with accompanying printed or electronic documentation (e.g., shrink wrapped software), preloaded with a computer system (e.g., on system ROM or fixed disk), or distributed from a server or electronic bulletin board over a network (e.g., the Internet or World Wide Web).

Each of the inventive GUIs may be constructed by conventional software programming techniques known in the art. It is preferred that the GUIs be constructed by visual builders, such as OCX™ (available from Microsoft Corp.) or Delphi™ (available from Borland Corp.). Database functions, such as storing information, searching through records, accessing records, and modifying records, are all performed by the underlying database application program product. The exemplary database uses Notes to perform each of those functions.

Although various exemplary embodiments of the invention have been disclosed, it will be apparent to those skill in the art that various changes and modifications can be made which will achieve some of the advantages of the invention without departing from the spirit and scope of the invention. These and other obvious modifications are intended to be covered by the appended claims.

Having thus described the invention, what we desire to claim and secure by Letters Patent is:

1. Apparatus for use with a computer system having a memory and a display, the apparatus residing in the memory and generating a graphical user interface displaying information relating to a database storing a plurality of topics and responses to those topics, each response having a content, title, author, and posting date, the graphical user interface comprising:

a calendar view having a two-dimensional grid in which a timeline is displayed along one dimension of the grid, and an index listing the plurality of topics is displayed along the other dimension of the grid, the timeline displaying a plurality of equal time units, the calendar view further having means for graphically displaying the number of responses posted to each topic during the time designated by each time unit; and

a report view adjacent to the calendar view, the report view having means for displaying indicia relating to each response posted to one of the plurality of topics.

2. The apparatus as defined by claim **1** wherein the calendar view includes means for causing the content of each response posted to the one of the plurality of topics to be displayed in front of the graphical user interface.

3. The apparatus as defined by claim **1** further including means for displaying the content of the response in the form of a column.

4. The apparatus as defined by claim **3**, wherein the displaying means displays the content of a plurality of responses in two columns.

5. The apparatus as defined by claim **4**, further including means for scrolling the responses in a serpentine manner.

6. The apparatus as defined by claim **3**, wherein the displaying means includes means for displaying preselected groups of responses.

7. The apparatus as defined by claim **1** wherein the report view includes means for displaying the title, author, and posting date of each response posted to the one of the plurality of topics.

8. The apparatus as defined by claim 1 wherein the response has an author, the report view including:

means for accessing a second database having information related to the author; and

means for displaying the author information in front of the graphical user interface.

9. The apparatus as defined by claim 1 wherein the first graphical user interface includes means for identifying one or more users simultaneously using the graphical user interface.

10. The apparatus as defined by claim 1 wherein the report view includes means for displaying the contents of the response to the topic in front of the graphical user interface.

11. The apparatus as defined by claim 1 wherein the report view includes means for excluding indicia from being displayed in the report view, the excluded indicia begin indicia identifying previously read responses.

12. The apparatus as defined by claim 1, wherein a duty database is stored in the memory, the duty database containing information related to duties of selected users of the database.

13. The apparatus as defined by claim 1, wherein the calendar view has a field view, the apparatus further including (1) means for scrolling the timeline; and (2) means for displaying responses not in the field of view.

14. The apparatus of claim 13, wherein the calendar view has a current field of view, the apparatus further including means for directly returning to the current field of view.

15. A method of summarizing information stored in a database, the method being for use with a computer system having a memory and a display, and generating a graphical user interface displaying information related to a database on the display, the method comprising the steps of:

A. accessing the database, the database containing a plurality of topics and responses posted to those topics, each response having a content, title, author, and posting date;

B. displaying a two-dimensional grid on a display device, the grid having a timeline designating a plurality of equal time units along a first dimension, a list of the plurality of topics stored in the database along a second dimension, and grid indicia aligned with both one of the equal time units and one of the topics, the grid indicia indicating that a response was posted to one of the of topics at a time designated by the one of the equal time units; and

C. displaying adjacent to the grid, in response to a user selecting one of the plurality of topics in the second dimension of the grid, report indicia related to each response posted to the selected topic.

16. The method of summarizing data in a database as defined by claim 15 wherein the report indicia includes the title, author, and posting time of each response posted to the selected topic.

17. The method of summarizing data in a database as defined by claim 15 comprising the further step of:

D. displaying indicia indicating the total number of responses posted to the one of the topics on the one of the equal time units.

18. The method of summarizing data in a database as defined by claim 15 comprising the further step of:

E. displaying, in response to a user selecting the grid indicia, the content of the response posted to the one of the plurality of topics at the time designated by the one of the equal time units.

19. The method of summarizing data in a database as defined by claim 15 comprising the further step of:

F. displaying, in response to a user selecting the report indicia, the content of the response related to the selected report indicia.

20. The method of summarizing data in a database as defined by claim 15 further comprising the steps of:

G. accessing a second database containing the names of the users displaying the two-dimensional grid; and

H. displaying the names of the users listed in the second database.

21. A computer program product for use with a graphics display device, the computer program product generating a graphical user interface on the display device for summarizing information stored in a database containing a plurality of topics and responses posted to those topics, each response having a content, title, author, and posting date, the computer program product comprising a computer usable medium having computer readable program code thereon, the computer readable program code including:

program code for accessing the database;

program code for displaying a two-dimensional grid on a display device, the grid having a timeline designating a plurality of equal time units along a first dimension, a list of the plurality of topics stored in the database along a second dimension, and grid indicia aligned with both one of the equal time units and one of the topics, the grid indicia indicating that a response was posted to one of the of topics at a time designated by the one of the equal time units; and

program code for displaying adjacent to the grid, in response to a user selecting one of the plurality of topics in the second dimension of the grid, report indicia related to each response posted to the selected topic.

22. The computer program product as defined by claim 21 further including program code for displaying indicia indicating the total number of responses posted to the one of the topics on the one of the equal time units.

23. The computer program product as defined by claim 21 further including program code for displaying, in response to a user selecting the grid indicia, the content of the response posted to the one of the plurality of topics at the time designated.

24. The computer program product as defined by claim 21 further including program code for displaying, in response to a user selecting the report indicia, the content of the response related to the selected report indicia.

25. The computer program product as defined by claim 21 further including:

program code for accessing a second database containing the names of the users displaying the two-dimensional grid; and

program code for displaying the names of the users listed in the second database.

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